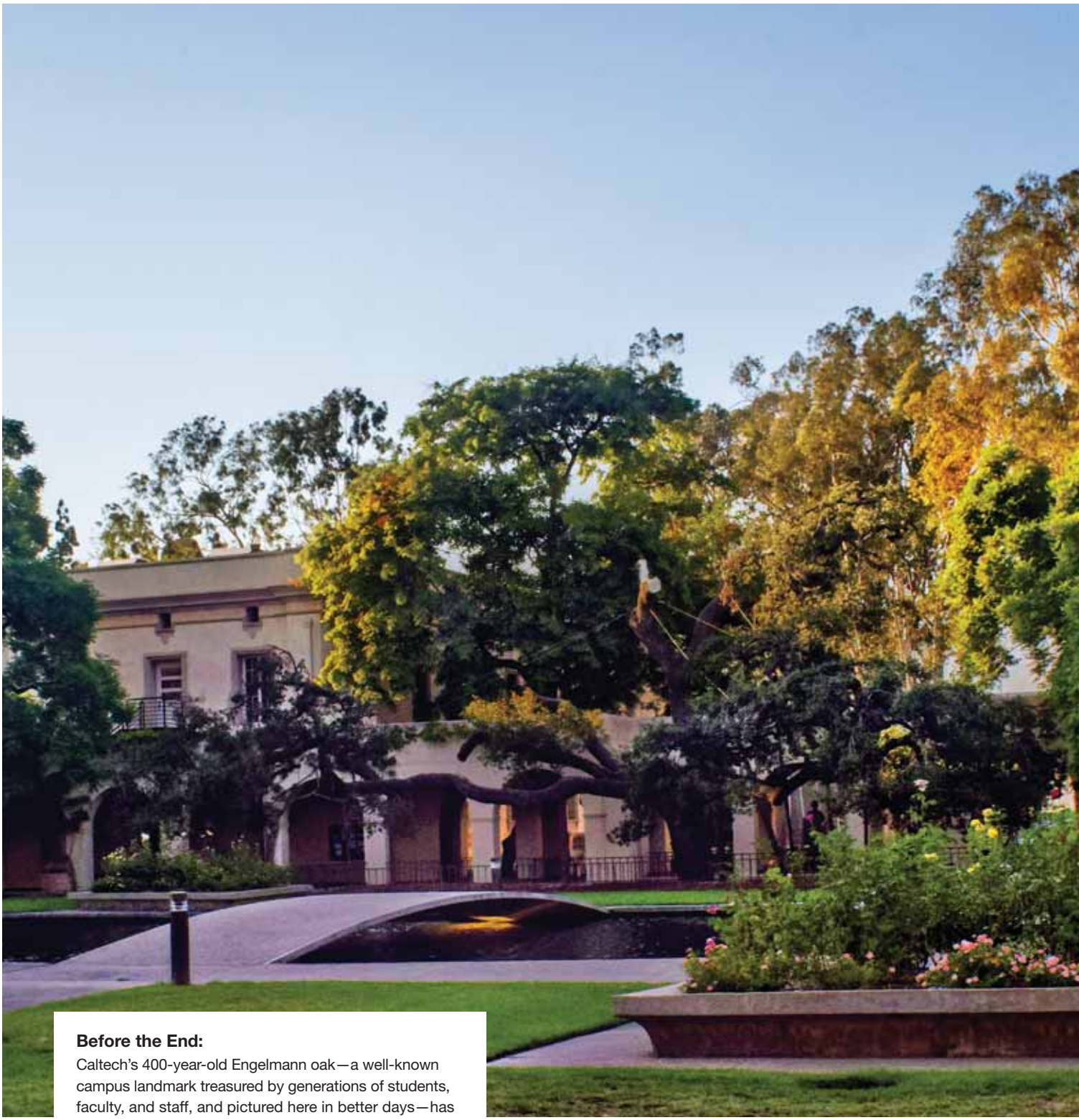
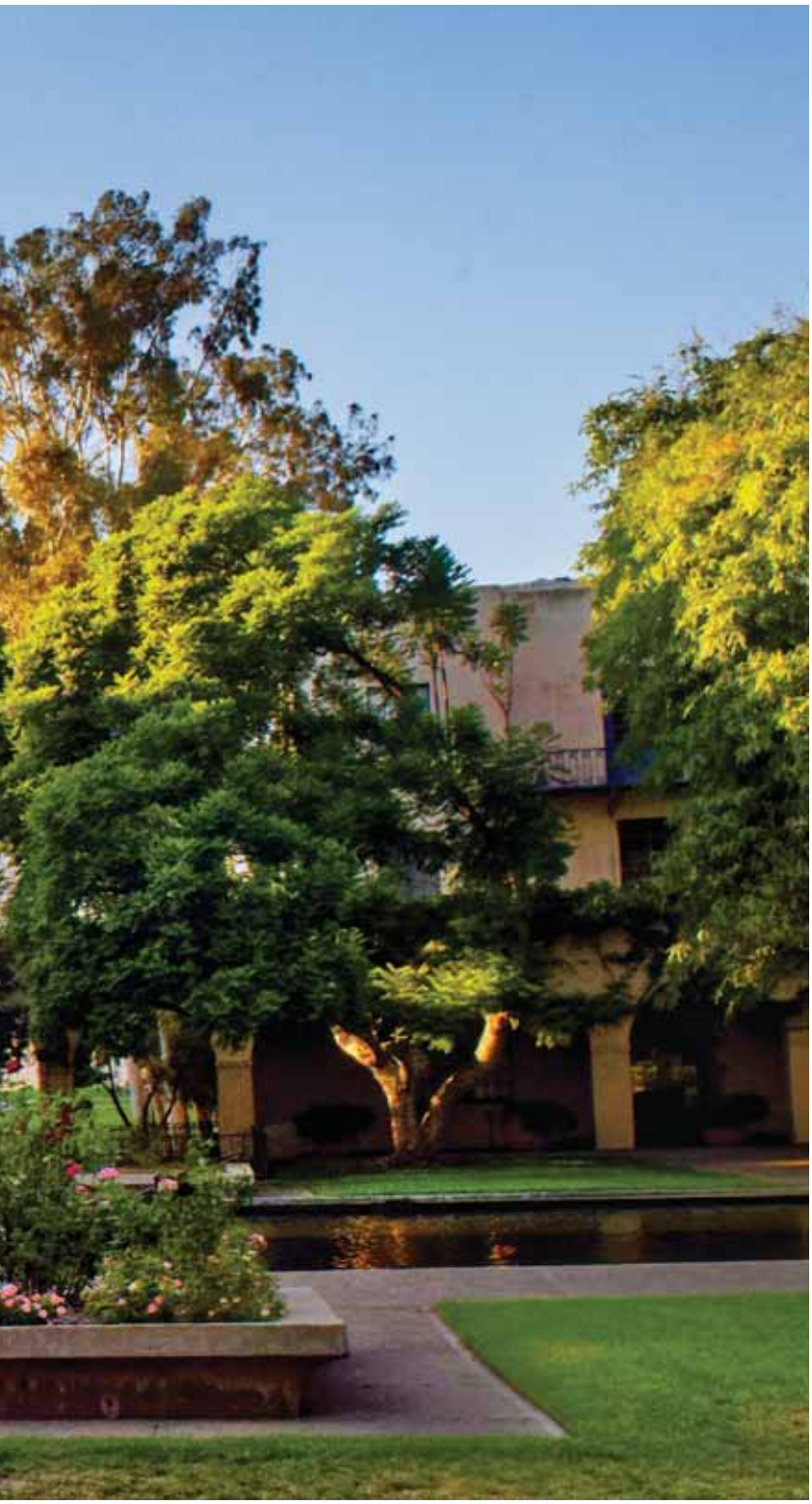


Before the End:
Caltech's 400-year-old Engelmann oak—a well-known campus landmark treasured by generations of students, faculty, and staff, and pictured here in better days—has officially succumbed to disease and old age. To learn more about the origins and history of this iconic tree, which sprouted long before the Institute was ever envisioned, see page 15.

SoCaltech



- Meet Caltech band director Glenn Price
- The Athenaeum kitchen doubles in size
- A physics class like no other
- Hollywood comes to Caltech

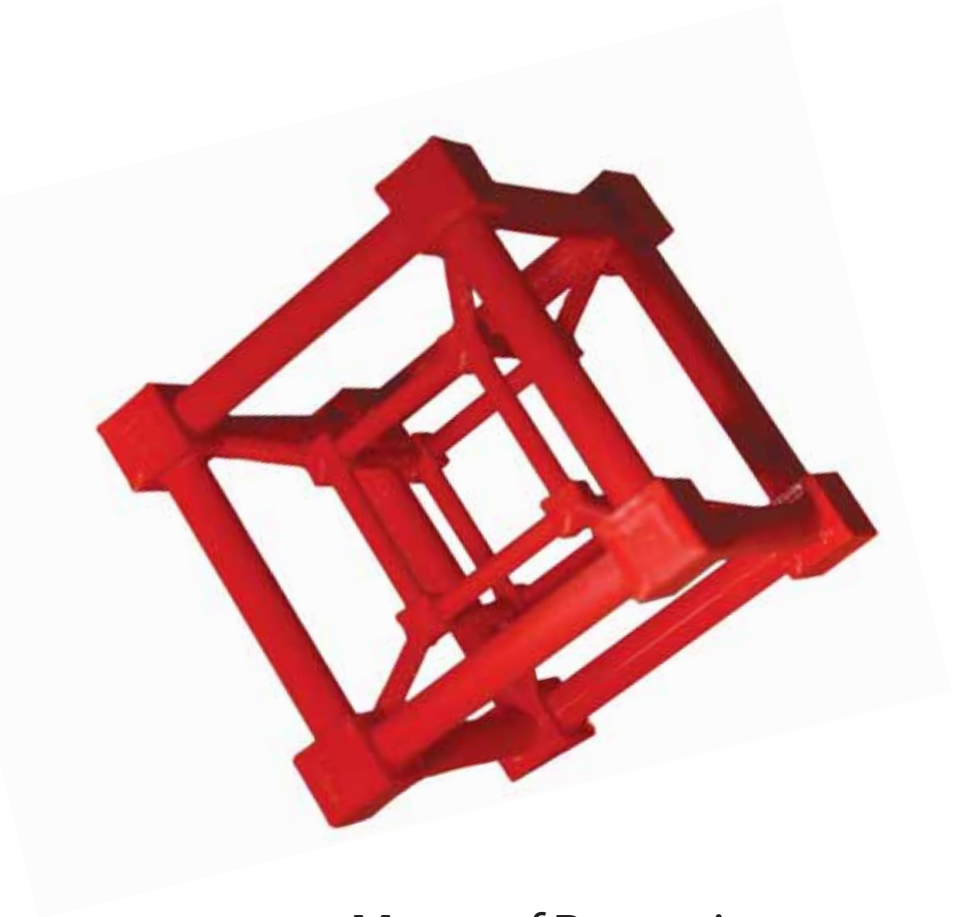
Did you know?

Caltech is a patent-producing powerhouse. Compared with MIT, Caltech is granted twice as many patents per researcher, and three times as many as Stanford. Over the past 22 years, technologies created by Caltech researchers have formed the basis of 238 new companies.

To help inspire the next generation of Institute innovators, Caltech held its inaugural Innovation Week last November, in which a dozen alumni entrepreneurs and investors shared their experiences. The keynote speaker was former astronaut Garrett Reisman (MS '92, PhD '97). After receiving a degree in mechanical engineering at Caltech, Reisman joined NASA as a mission specialist and logged a total of three months in space on two separate missions. He then transferred to the public sector, where he currently serves as SpaceX's director of crew operations.

"The whole lifeblood of [SpaceX] is innovation and disruption," he told the student audience. "The status quo has got to be the enemy. If it's not—if the status quo is a nice comfortable friend—then you're not going to have an innovative culture in your organization."

For more SoCaltech, go to **magazine.caltech.edu/socaltech**



Object Lesson: Matter of Perception

Caltech makes 3-D printing available to anyone with a campus ID card through its TechLab—located on the first floor of Sherman Fairchild Library—which provides hands-on access to a host of technologies related to prototyping and modeling. To help community members turn ideas into objects, workstations throughout the library are equipped with SolidWorks, a software program used to make and manipulate 3-D images for printing. Shown here is a model printed by Ray Sun (BS '20), inspired by *Perception,* a sculpture created by Caltech trustee Ronald Linde (MS '62, PhD '64) to grace the space outside the Ronald and Maxine Linde Center for Global Environmental Science. (Model design by digital design repository Thingiverse.)

Three Questions for:

Glenn Price

Director of Performing and Visual Arts and Band Director

Glenn Price joined Caltech last fall with an international reputation as a conductor and music educator. His career has taken him to Japan, Europe, and Russia; he has conducted in more than 30 countries, with full-time positions in Canada and the United States. Most recently, he was director of winds and ensembles at the University of Cincinnati College-Conservatory of Music.

1. What have you learned about Caltech students?

They're smart, retain information very well, and learn quickly. The other characteristic the students share is that they are only participating because they love it; nobody is doing this as a major or degree requirement. Students talk about how music balances their lives, gives them artistic fulfillment, and adds a social component. Those three elements have created an alchemy for many of them that has had a profound impact on their lives at Caltech. I remind myself of that every time I go to rehearsals.

2. What are your first impressions about the arts at Caltech?

We have a lot of arts activities on campus, but in different pockets, and they could be brought together in a more unified way. Awareness, access, and communication are some of my key guiding principles.

3. How are you enjoying life in Southern California?

California arts groups are booming right now, so it's an interesting time to be here. The orchestra scenes in L.A. and San Francisco are thriving, whereas other places that have historically been leaders are struggling. Here, there is a huge appetite for the arts, which makes it an exciting and fulfilling place to live.

For more of our conversation with Glenn Price, go to magazine.caltech.edu/post/glenn-price

"I am probably one of the bigger geeks on the cast, so I was hugely excited to be working on such a science-heavy show. Coming on this kind of panel is a very different experience from the Comic-Con panels that I'm used to. Normally we're talking about comic books and video games. Here we're having discussions about time-sync differentials and gravity wells."

– *Actor* Cas Anvar
(who plays Alex Kamal), at the January 25 Caltech panel

Read about the panel and watch a video at
magazine.caltech.edu/post/expanse-visits-caltech

Rath Al Fresco: 2.0

A new 1,900-square-foot kitchen addition opened at the Athenaeum this spring. The Rath Al Fresco Pavilion offers diners a variety of new grab-and-go lunchtime options, including salads and sandwiches. From May through October, members can dine outside in a peaceful, newly landscaped terrace setting under the Deodar cedars.

The new space, attached to the Athenaeum's existing kitchen, doubles the club's food-prepping square footage.

From mojitos to craft brews to strawberry lemonade, the new walk-up bar is stocked for every thirst.

The Pavilion's new pizza oven delivers hot pies in a matter of minutes.

Read more about Physics 11 at magazine.caltech.edu/post/physics-11

Daniel Mark (BS '20) at the white board during a weekly meeting of Phys 11, the freshman seminar where thinking outside the box is the norm.

Reinforcing the Caltech-Huntington Connection

Who

Barely a mile apart, Caltech and The Huntington Library, Art Collections, and Botanical Gardens have long served as twin anchors of Pasadena's intellectual and cultural life.

What

The Caltech-Huntington Humanities Collaborations brings scholars together across the two institutions for a series of two-year multidisciplinary research modules. "Violence and Order Past and Present," the theme chosen for the 2016-18 module, looks at the role of violence in political and social order.

How

For the module, coordinated by English professor Jennifer Jahner and history professor Warren Brown, Caltech shares a postdoc (Leah Klement, pictured) and two senior research fellows with The Huntington. Workshops and lectures have brought an array of scholars to Pasadena, including Bruce Hoffman, from Georgetown University's Edmund A. Walsh School of Foreign Service, who spoke on terrorism and counterinsurgency.

Why

For Jahner, the project is an extension of the interdisciplinary work that is the norm in the humanities and social sciences division. "Warren and I are used to talking across our disciplinary divides," she says, "and so basically we've widened the scope so we can get more people involved in the conversation. It's great to collaborate with art historians, political scientists, and people working on contemporary terrorism."

Class Act:

Physics 11

Among the classes a Caltech freshman can take, Physics 11 stands out. Before even gaining entrance to the popular seminar, students must jump through a series of intellectual hoops. The few who are accepted embark on a singular learning journey.

Jumping hurdles

Late Caltech Robert H. Goddard Professor of Physics Thomas Tombrello, who created the class almost 25 years ago, challenged prospective students to complete two "hurdles" as a test for admittance to the class. These were questions—riddles really—that had no right answer and often seemed to have little to do with physics.

Class culture

The class gathers once a week without a set agenda. "We might talk about the science of the movie *Interstellar* or the physics of breaking waves," says Rob Phillips, the Fred and Nancy Morris Professor of Biophysics and Biology, who has co-taught the class since 2014.

How to wonder

"What's cool about Phys 11, and why I feel passionate about it," says Phillips, "is that we're challenging students by giving them things we don't know the answers to and not being so focused on making them into technicians. Instead, we're teaching them how to ask questions, how to wonder."

Tackling the open-ended

As class and Caltech alum Charles Tschirhart (BS '15), currently a graduate student in physics at UC Santa Barbara, puts it, Phys 11 is meant to "train young scientists how to attack the kinds of difficult, poorly defined, open-ended problems often encountered in research."

Launching pad

Phys 11 graduates have secured Hertz, National Science Foundation, and Marshall scholarships as well as entrance to top graduate schools. Is it a springboard to success? "I don't know how you would decide that," says Dave Stevenson, the Marvin L. Goldberger Professor of Planetary Science, who has co-taught the course for more than two decades. "I think these students are destined to excel anyway. But for the small subset of students who take this course, it's something very special."

"Touring the campus, I was struck by what an amazing time it is to be a student at an institution like Caltech. In every field—from engineering and biology to chemistry and computer science—I learned about phenomenal research underway to improve our health, find new energy sources, and make the world a better place."

– **Bill Gates,** writing on his blog about his October 20 visit to Caltech

ON LOCATION

In February, geography was temporarily upended as the cast and crew of the Emmy Award–winning HBO series *Silicon Valley* visited Caltech to film an episode for the show's fourth season (which kicked off April 23). As co-executive producer Jim Kleverweis noted, "The main challenge of shooting on a college campus is not to interrupt classes and to be respectful of the professors, staff, and their workspaces." For the one-day shoot, trucks began arriving before dawn and by the time students were up and about, Beckman Lawn had been transformed into a base camp with catering trucks and tents; extras were being schooled on their roles; and series regulars Thomas Middleditch, Josh Brener, Martin Starr, Kumail Nanjiani, and Zach Woods were prepping for the first scene of the day.

30	82	125	187
Trucks	Extras	Crew	Meals Served

augmented poetry [n]

1: a way to create poetry using rule-based and statistical-probabilistic computer algorithms that generate text using the internet, similar to how Google automatically completes search terms and mobile phones make suggestions when a user starts typing a text message.

2: a subject that is being taught on campus this spring by Israeli computer programmer, poet, and new-media artist Eran Hadas, whose residency at Caltech is sponsored by the Schusterman Visiting Israeli Artist Program.

"I think it will be the first time I am going to be outgeeked," says Hadas of Caltech's code-savvy students, "not by just one or two students, but by the entire class."

Hadas's previous projects include a headset that generates poems from EEG brain waves and a software-based rewrite of the Torah in haiku verse.

For more about Eran Hadas, go to magazine.caltech.edu/post/eran-hadas