# SoCaltech

- Grant D. Venerable House celebrates a new era
- Hustle and bustle as students return to campus
- Tales of Caltech's trees

## Collision Course

Staff scientist Philip Appleton has spent the last 18 years studying Stephan's Quintet, a grouping of five galaxies made famous as heaven in *It's a Wonderful Life* (directed by Frank Capra, BS 1918). So when the first batch of long-awaited, jaw-dropping images from NASA's new James Webb Space Telescope (JWST) included a new mosaic of the quintet, it was a windfall for Appleton and his colleagues at Caltech's IPAC astronomy center. The team has studied this turbulent region with instruments such as the now-retired Spitzer Space Telescope, whose data archive is based at IPAC. (Spitzer was managed by JPL; Caltech manages JPL for NASA.)

Upon release of the composite view, made possible by infrared vision and constructed from almost 1,000 separate image files, Appleton recorded a video discussing why the new picture will lead to a better understanding of galactic evolution and stellar birth.

"What's fascinating about Stephan's Quintet is that all these galaxies are crunched together in a very small area of space," he said. "Imagine our own Milky Way system, which is a giant pinwheel of rotating gas and dust. The nearest galaxy to us is the Andromeda Galaxy, which is faint, fuzzy in our own sky when we look up there. But the Stephan's Quintet … these galaxies are very, very close, within almost one-tenth of the distance between our own Milky Way and the Andromeda. As a result of that, they tend to be smashing into each other and colliding and producing what we call tides, just like you have tides on Earth, except that in galaxies, tides cause these long tails to be produced when galaxies pass by each other very closely. This is a beautiful example of that."

**To watch the video, visit: magazine.caltech.edu/post/quintet**

**“We have to do everything we can to convince people that in the United States elections are in fact being run freely and fairly and that they’re free from fraud. That’s a tall order for one faculty member at Caltech. But it is the sort of thing that here at Caltech we can do to help and that election scientists throughout the country are going to be doing in this election cycle and in the future to try to help turn this around.”**

**Michael Alvarez,** *professor of political and computational social science, speaking ahead of the 2022 midterm election about the role of election scientists in combating misinformation.*

## A Matter of Scale

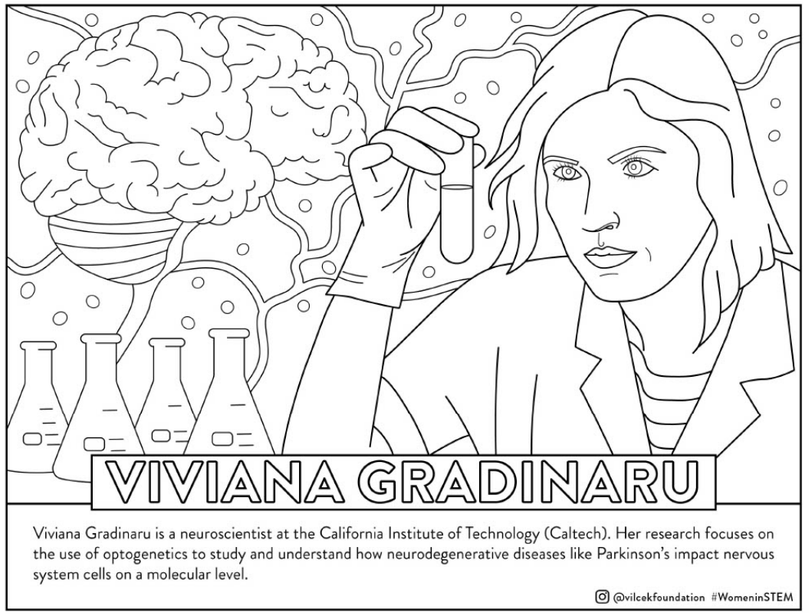
Nick Scoville, Francis L. Moseley Professor of Astronomy, Emeritus, has devoted more time to art projects since his retirement in 2016. Some of his projects include hanging tables, sculptural pot racks, and most recently, a large hanging fish. Scoville used sheets of perforated aluminum to create the fish mobile, which hangs among the trees outside his house atop Mount Washington near Highland Park. The metal sheets were laid out in such a way to create an interference, or moiré, pattern that shifts as the mobile moves in the sunlight and makes the material look like fish scales. Scoville, who joined the Caltech faculty in 1984, has been a sculptor for most of his career. “With science, I like to use my brain to figure things out; with art I like to start with a completely blank slate,” he says. In both cases, his overarching goal is to come up with “something new and completely different.”

# New Namesake

The Caltech community gathered on the Olive Walk for the dedication of the Grant D. Venerable House on October 21, 2022. The undergraduate student residence was named in fall 2021 in honor of the late alumnus, who was the first Black student to graduate from Caltech as well as an active student leader and athlete during his time on campus. Venerable’s children—Grant D. Venerable II, Lynda Venerable Ellington, and Lloyd Venerable—addressed the crowd. His daughter, Venerable Ellington, said, “When my older brother called me a number of months ago and told me that this was going to take place, I think I spent the next few days in joyous tears, truly.”


Read more about the event:

## STEM in Color




Viviana Gradinaru (BS ’05), a Caltech professor of neuroscience and biological engineering and director of the Center for Molecular and Cellular Neuroscience, is included in a coloring book called ***Think Like a Girl: A Coloring Book of Women Pioneers in STEM***, which was published by the Vilcek Foundation in February 2021. All of the women featured in the book are immigrants to the United States who have been recognized by the foundation. Gradinaru, who was born in Romania, received the 2020 Vilcek Prize for Creative Promise in Biomedical Science.

Send a photo of your—or your kids’—colored-in picture to **magazine@caltech.edu**, and we might just publish it in our next issue.

Download the book:

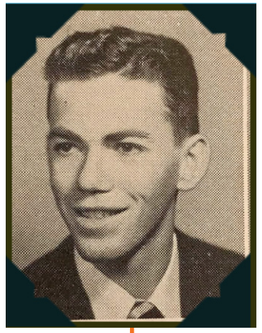
# SQUARE ROOTS


Nobel Laureate Barry Barish now has a physical place in history to accompany his place in physics history. In May 2022, the Los Angeles City Council dedicated the intersection of Aloha and St. George streets, adjacent to John Marshall High School in the neighborhood of Los Feliz, as Dr. Barry Barish Square in honor of the physicist who graduated from the school in 1954.

Barish, the Ronald and Maxine Linde Professor of Physics, Emeritus, shared the 2017 Nobel Prize in Physics with his Caltech colleague Kip S. Thorne (BS '62), the Richard P. Feynman Professor of Theoretical Physics, Emeritus, at Caltech, and MIT's Rainer Weiss, for their contributions to the Laser Interferometer Gravitational-wave Observatory (LIGO) and the direct observation of gravitational waves. LIGO is supported by the National Science Foundation and operated by Caltech and MIT.

Barish, who also attended Micheltorena Elementary and Thomas Starr King Middle schools in Los Angeles, says he is honored by the gesture and that his experience at Marshall was transformative.

"During my time at Marshall, I 'discovered' advanced math and modern science, and that period set me on a path toward a long career in physics," Barish says. "I am an example of a kid who was educated and found his way through the public education system in the U.S. We should treasure and nurture it as an essential part of what makes America special."



Facing page: Barish (right) with Gary Garcia, principal of John Marshall High School. Left: High School portrait, winter class of '54.

## Caltech in Five Trees

**Bryan Vejar, Caltech's arborist for the last three years and founder of the Caltech Tree Corps, wants to educate the public about the power of trees, so people can soak in the grandeur around them. Here, Vejar describes five species across campus that tell the story of Caltech's treescape:**

"There is the concept called 'plant blindness,'" says Vejar, who performs daily maintenance with his team on the Institute's living collection, which includes some 3,400 trees in and around campus and faculty housing. "You can be walking under the trees but not even notice them, which is crazy because there are these gigantic, living, dynamic life forms all around us. If there was a giant whale next to you, you'd be saying, 'Oh my God, what an amazing thing.'"

### 1. Coast Live Oak

The backbone of our native woodlands, the long-lived coast live oak has held watch over our ecosystem since long before Caltech was around. This one shades the picnic tables outside Broad Cafe. A keystone species of cultural and ecological importance, many hundreds of other native species rely upon it for habitat and sustenance. Extra care is taken to help preserve them on campus wherever appropriate. [Tree ID: 2132]

### 2. Engelmann Oak

The rarest and most threatened of Caltech's native oaks, the venerable Engelmann oak's natural range extends along a narrow strip from Pasadena to San Diego County. Our most famous one, the Founders Tree, grew proudly near Caltech Hall until it died in 2016 and was turned into the long table in the Red Door Marketplace. Few mature specimens, such as this giant in the north court of the George W. Downs Laboratory of Physics and Charles C. Lauritsen Laboratory of High Energy Physics, remain on campus. [Tree ID: 2652]

### 3. Jacaranda

The jacaranda is native to tropical regions of South America but is ubiquitous across campus and the Los Angeles area because the species is drought tolerant and well adapted to our climate. This particular tree is located outside the Athenaeum. The jacaranda shades walkways with its large fern-like leaves, and it signals the end of the school year with an explosion of purple confetti in mid-to-late spring. [Tree ID: 696]

### 4. Coast Redwood

Our state tree, the coast redwood has claimed its place as an icon of our environment. Its fibrous bark and splays of flattened needle-like leaves recall images of foggy, towering coastal forests. Though Caltech has many, like this one just outside Powell-Booth Laboratory, they struggle with Southern California's dry summers. For this reason, this magnificent species will be gradually phased out of our urban forest. [Tree ID: 2870]

### 5. American Sweetgum

The most plentiful tree species on campus, this Eastern and Central American native was once thought to be the perfect tree to import to California. It is one of the few trees here that undergoes a dramatic fall transformation, when its maple-like leaves turn from bright green to striking yellow to fiery reds and deep burgundies. The sweetgum has fallen out of favor because it sheds seed pods (known as ankle breakers), plays host to a variety of invasive pests and diseases, and its shallow roots often lift sidewalks. [Tree ID: 1051]

Vejar has created a map detailing every tree on Caltech's campus. Find each tree above through their ID number:

# Sandra O'Neill (fourth-year undergraduate 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.*

*Sandra O'Neill co-authored a study published in* The Astrophysical Journal Letters *in February 2022 that showed evidence for the tightest-knit supermassive black hole duo observed to date. O'Neill began college as a chemistry major and had planned to work with Brian M. Stoltz, the Victor and Elizabeth Atkins Professor of Chemistry, as part of Caltech's Summer Undergraduate Research Fellowship (SURF) program in 2020. Due to COVID, that project fell through, but she picked up the astronomy project to stay active during the pandemic and began working with Anthony Readhead, Robinson Professor of Astronomy, Emeritus.*

"I was supposed to work in the Stoltz Lab for my SURF after my first year, but I couldn't. I emailed Carol Casey [associate director of student-faculty programs], and she told me, 'We actually got an email this morning from a professor who's looking for someone.' I hadn't taken an astronomy class before that, and I had to suddenly learn a bunch of things really quickly. Everyone in Professor Readhead's lab did an excellent job of guiding me. It could have been easy for me to just get through that first project and then go back to chemistry. This has definitely certified that I want to go into physics or astrophysics.

"I like it because it's similar to something like archeology in that both are quite messy fields. You can do your best to study an isolated system, or something that you pull out of the ground, but there are so many confounding variables that it's hard to understand the exact origins and the relevance. Here, we're also dealing with the past as it's coming to us and trying to understand the universe around us as it tells us about itself."

For more #SoCaltech, go to magazine.caltech.edu/post/Oneill



# Welcomed Back

The 2022–23 academic year officially kicked off at the end of September with the first day of instruction. But the Caltech campus began to bustle earlier in the month with the return of staff, faculty, students, and Institute leaders, who came together to greet new and returning undergraduates and graduate students in a series of events, including Convocation, New Student Orientation, welcome dinners, and picnics. Many of these events were held in person for the first time since the beginning of the pandemic, and the celebrations and opportunities to connect with peers and colleagues each attracted hundreds of participants. The first week of classes ended with the TechFest block party on Beckman Mall, which featured food, games, music, and more.

> **"I always wanted to work on neuroprosthetics because both of my parents have polio, and I feel like it's something that would really help them. So I'm just like, 'Pinch me, this is so surreal!' I'm here, and I'm very excited."**
>
> First-year student **Sanvi Pal**

# Life as a Seismologist

Pasadena and Alhambra high school sophomores and juniors have the chance to shake up their science education as part of the Seismological Laboratory's annual Caltech Earthquake Fellows program, which brought its first cohort to campus earlier this year.

Over their five months in the program, the inaugural 11 students experienced a compressed version of earthquake science research alongside Caltech graduate student mentors. The high school students posed questions, gathered data with individual seismometers, and collaborated in small groups to analyze and interpret findings. The participants presented their research to their mentors, friends, and families on September 17.

Offered in partnership with the Dr. Lucy Jones Center for Science and Society, the program strengthens ties between Caltech and surrounding communities and encourages students, particularly those from underrepresented backgrounds, to pursue scientific careers.

"We are grateful for the robust partnership that [the Pasadena Unified School District] has with Caltech," says Jodi Marchesso, principal of Sierra Madre Elementary School and the district's former STEM specialist. "Because of this partnership, our students have the opportunity to contribute to research that has an impact on science. It is experiences like this that create a connection between classroom learning and the world around us."

The fellowships offer a one-month immersion in seismology on Caltech's campus in the summer, flanked by Saturday sessions in spring and fall. During their month at Caltech, students tour the Seismological Laboratory and the wider campus; attend talks by experts in geophysics, seismology, and disaster preparedness; learn about college and scientific careers; conduct research; assemble a seismometer; and build coding and data visualization skills useful in several fields of study. After they finish the program, participants keep their laptops and seismometers and receive a stipend.

Jimmy Atterholt, a graduate student mentor, helped to craft the program's curriculum and worked with the students, several of whom were performing research for the first time. "In STEM, there is a high concentration of people who come from families full of people with scientific backgrounds. I don't come from one of these families, and I understand what a disadvantage that can be," he says. "I think it's good to have outreach programs to bring students who don't grow up in that environment into the fold and encourage them to do STEM."

—Ann Motrunich

Watch a video about the Earthquake Fellows program: