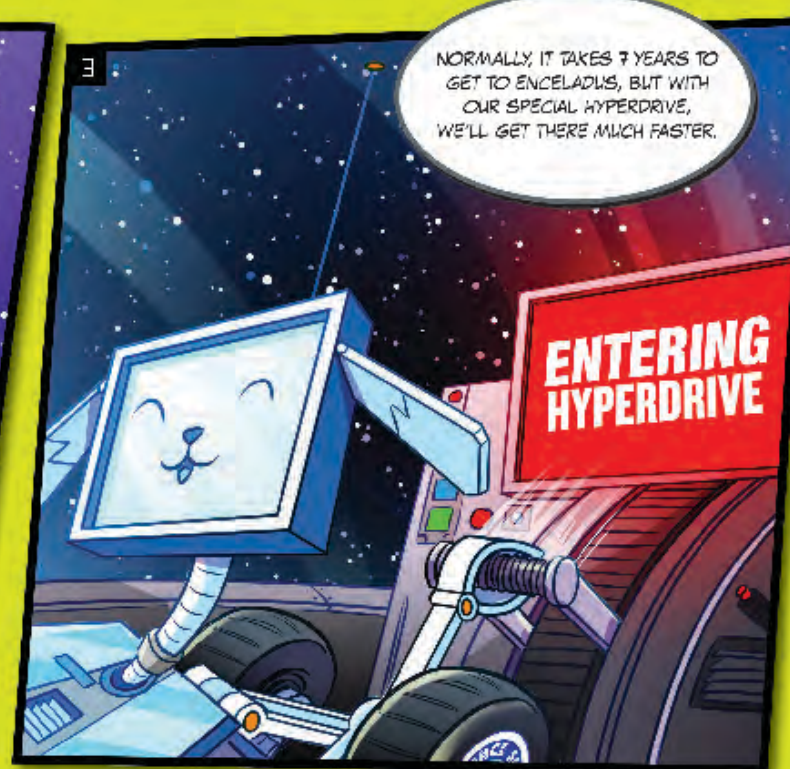


FROZEN WORLDS



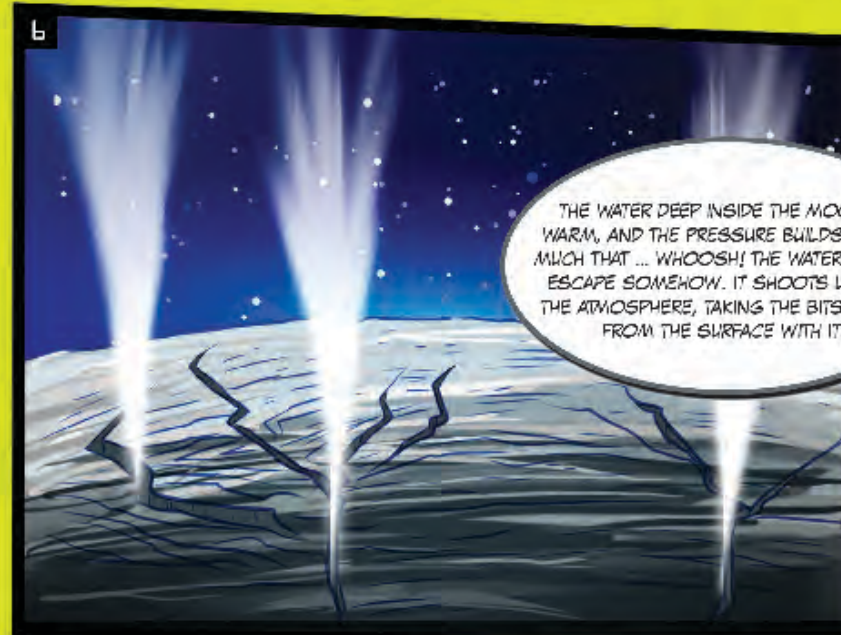
HEY, ROVER! LET'S HEAD HERE. THIS MOON HAS PLUMES. YOU KNOW, LIKE GEYSERS AT OLD FAITHFUL IN YELLOWSTONE PARK HERE ON EARTH. EXCEPT ITS GEYSERS SPRAY REALLY COLD WATER. BRRR.



THERE'S ENCELADUS, ONE OF SATURN'S MOONS. IT'S COMPLETELY COVERED IN ICE. IN SOME PLACES THE ICE SHELL IS 25 MILES THICK! YOU MIGHT THINK THAT THE CENTER OF THE MOON IS SOLID ICE, BUT SCIENTISTS DISCOVERED AN OCEAN THAT IS 6 MILES DEEP UNDERNEATH ALL OF THAT ICE.



SEE THOSE STRIPES, ROVER? THEY KIND OF LOOK LIKE THE SAME PATTERN A TIGER HAS, DON'T THEY? BUT THEY AREN'T COLORED STRIPES. THEY'RE FRACTURES, OR BREAKS, IN THE PLANET'S SURFACE MADE BY THE PUSHING AND PULLING OF SATURN'S TIDES AND KEPT OPEN BY WATERS TRAVELING UP FROM THE OCEAN BELOW.



THE WATER DEEP INSIDE THE MOON IS WARM, AND THE PRESSURE BUILDS UP SO MUCH THAT ... WHOOSH! THE WATER HAS TO ESCAPE SOMEHOW. IT SHOOTS UP INTO THE ATMOSPHERE, TAKING THE BITS OF ICE FROM THE SURFACE WITH IT!

- Five Frankenstein facts
- What makes an animal?
- Cold War culture in Rome
- All signs point to the cosmos

Solar Science with Dr. E

Exploring Mars with rovers, designing better mission instruments, and researching asteroids keeps Bethany Ehlmann busy. Not too busy, though, to devote hundreds of evening and weekend hours to producing a children's book—*Dr. E's Super Stellar Solar System*—with National Geographic Children's Books.

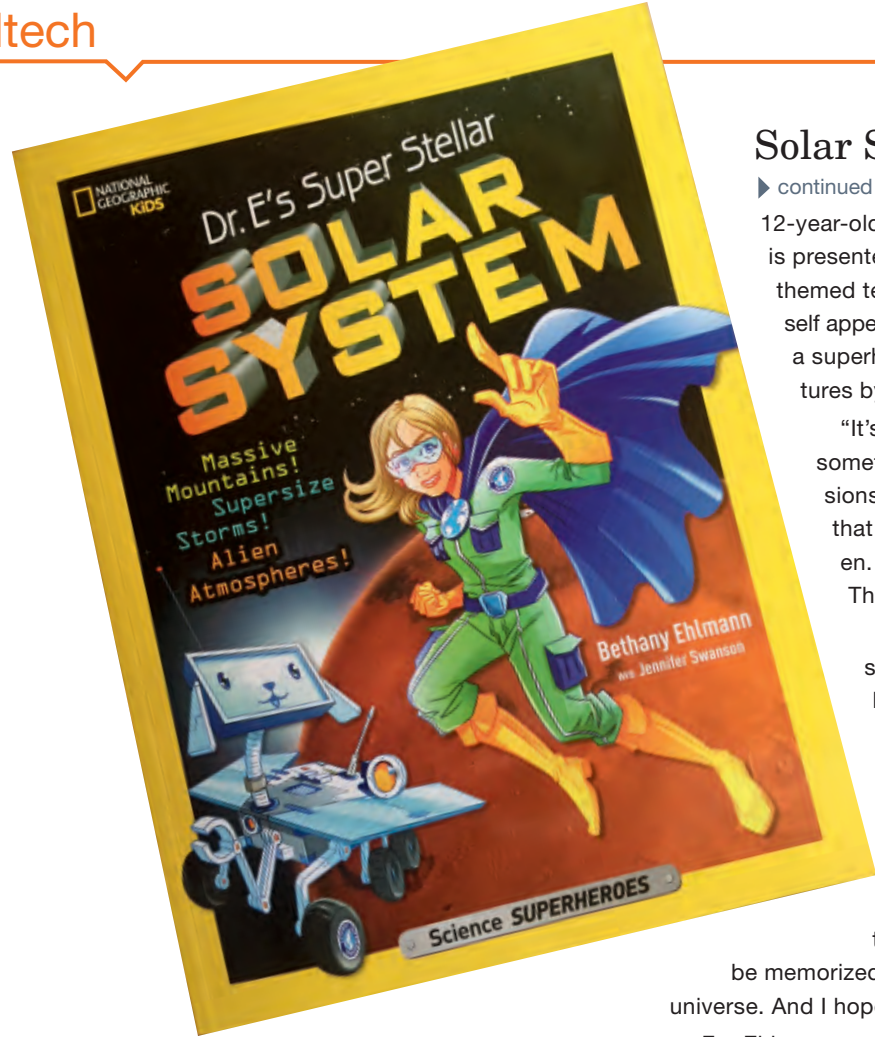
"Communicating what we do in planetary science is so important because it's some of the most inspiring scientific work there is," says Ehlmann, a professor of planetary science and a JPL research scientist. "We're pushing boundaries and learning things we never knew."

In the normal course of things, Ehlmann shares her knowledge of science through talks and lectures. The genesis of this recently published book came in 2013, when she was named an Emerging Explorer by the National Geographic Society, an accolade bestowed for outstanding work in the fields covered by the magazine.

Nat Geo asked Ehlmann to collaborate on a story-centered science book aimed at 8-to-

continued on page 6 ▶

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



Solar Science with Dr. E

▶ continued from page 5

12-year-olds. To draw in its young audience, the content is presented in a variety of ways—through comic strips, themed text, activities, and scientist profiles. Ehlmann herself appears as “Dr. E,” complete with infrared glasses and a superhero cape, and is accompanied on her adventures by a trusty robotic sidekick, Rover.

“It’s not a single narrative,” says Ehlmann. “It’s something you can hop around in. Images from missions and infographics delve into all the processes that shape planets. Some parts are more story driven. Others offer activities that are more hands on. The idea is to appeal to different styles of learners.”

For profiles, Ehlmann highlighted contemporary scientists—including Caltech’s Mike Brown and Konstantin Batygin—rather than “the old tried and true” astronomers from the 1500s and 1600s like Copernicus and Galileo.

What does Ehlmann hope her young readers will take away? “A continued sense of curiosity and an awareness that it’s in our power to learn still more about the mysteries out there. Science is not a collection of dry facts to be memorized. It’s a dynamic means of understanding the universe. And I hope they learn that science is fun, too.”

For Ehlmann, working on the publication has been eye-opening. “You can get really focused on being an expert on your own little part of the vast enterprise,” she notes. “Sometimes you need to step back. There’s nothing like having to explain to an 8-year-old to get you thinking of the big picture.”

SURF’s Up

Every summer, Caltech students have the opportunity to do research with experienced mentors working at the frontiers of their fields. This year, SURF (Summer Undergraduate Research Fellowships) participants are studying everything from **climate change** and **glacier dynamics in high-mountain Asia** to **the fabrication of flexible electrode arrays for artificial skin**.

SURFing this summer:

455 Student participants

197

Campus/JPL mentors

310

On-campus SURF projects

85

JPL-based projects

60

Off-campus SURF projects

Class Act:

The Human Animal

A new humanities class, offered this past winter at Caltech, took students on a literary, historical, and philosophical journey through ideas about what makes a human, what makes an animal, and what makes them different.

Required reading

Students enrolled in The Human Animal explored these questions through readings such as *The Dialogue of the Dogs*—a 17th-century novella from Spain in which two dogs converse about their masters, the ills of human society, and their own use of language—and fables by 17th-century French author Jean de La Fontaine, whose fictional creations include a community of frogs who, after begging the gods for a king, are cursed with a tyrannical and very hungry crane as a monarch.

Delving deeper

Topics for discussion included the question of animal “rationality”; early modern representations of the mentally and physically ill; and philosopher René Descartes’ insistence that animals are little more than soulless machines.

Animal magnetism

“No one is neutral toward animals,” says comparative-literature professor Jocelyn Holland, who conceived the idea for the class out of a desire to offer students a humanities course with broad appeal. “We have an affection for them, and we all have an idea of what they are like.”



Holland also had her students read part of Jonathan Swift’s *Gulliver’s Travels*, in which Gulliver meets the Houyhnhnms, a race of intelligent horses with an advanced society, and the Yahoos, a race of human-like creatures with animalistic behaviors who are ruled by their Houyhnhnm overlords.

This 1853 engraving by French caricaturist J. J. Grandville depicts animals behaving as humans.

“We focus on a time period with big debates about the distinction between the human and the animal: whether they have souls, whether they can think and communicate, and whether we are responsible for treating them ethically,” Holland says. “My goal is for the students to understand that an animal is a complex entity. There is nothing simple about the concept ‘animal.’”

From the Caltech Archives Oral History Project

To date, the oral history project has published more than 160 interviews. Read them at oralhistories.library.caltech.edu.

“I was a nerd and studied physics and billiards—I did a lot of pool playing. I quit engineering as a goal, because I found out that physics majors and physicists could work on whatever they wanted.”

– Jerry Pine, Caltech professor of physics, emeritus (1928-2017)

Six Questions for : Melanie Masterton Sherazi

Melanie Masterton Sherazi has a fascination with Rome. Not the iconic Rome of the Trevi Fountain and the Colosseum. Rather, Sherazi's focus—and the theme of the book she is currently writing—is the literature, visual culture, and performance art produced by African Americans in Rome during the Cold War. Sherazi, the Howard E. and Susanne C. Jessen Postdoctoral Instructor in the Humanities at Caltech, became interested in this field of study through the work of the late African American expatriate author William Demby. Intrigued by Demby's work after reading his semiautobiographical experimental novel *The Catacombs* (1965), Sherazi went on to edit his final completed manuscript, *King Comus*, after his death in 2013. The novel was published by Ishmael Reed Publishing Company in 2017.



1. Why focus on Rome?

Though Paris and London are better known as magnets for American expatriates, my work argues for Rome's importance as an artistic hub where expat writers and artists collaborated with Italian artists and filmmakers, and were in direct conversation with the period's social movements.

2. What makes William Demby's work so important?

Demby innovated novelistic forms and styles, traveled internationally as a journalist in the postwar years to countries including Ethiopia and Japan, and collaborated in Rome with leading Italian filmmakers, including Rossellini and Fellini. Nevertheless, his groundbreaking work remains largely understudied in the United States, likely owing to his living abroad in Italy for more than 20 years.

3. How did you become interested in this field of study?

I had the pleasure of inventorying Demby's papers from Rome in his son's residence in Italy; this rich material opened onto a broader postwar cultural milieu that inspired my current book project.

4. You taught in the Los Angeles Unified School District for several years. What did you take away from that experience?

I had a wonderful experience teaching public high school English in LAUSD for eight years. My students

brought a lot of humor and energy into the classroom, and I taught alongside many devoted colleagues who were passionate about public education. This experience gave me a long view of students' diverse learning styles and range of interests, which continues to inform my current approaches to teaching.

5. Why Caltech?

This postdoctoral instructorship gave me the opportunity to continue working on my current book and to design my own courses in a rigorous academic environment. I earned my degrees at the University of California, and Caltech is situated ideally in Southern California's vibrant research network.

6. What is it like to be at an institute primarily focused on science and technology?

I have found that the humanities are integrated seamlessly into Caltech's curriculum. My students have expanded my own ideas about literature with their original interpretations, driven by their interests and areas of expertise. For instance, a female student homed in on the fact that the young female protagonist of Carson McCullers' novel *The Member of the Wedding* (1946) planned to study radar in the future—a detail to which I had not paid particular attention. This student's insight guided our discussion in a new direction that complicated traditional readings of the novel's ending.

Object Lesson

Line of Sight

On a large and sprawling campus like JPL, signage is key to directing visitors from point A to point B. Hungry for lunch? Follow the signs to the Orbit Cafe. Interested in something a little more galactic? There's a sign for that, too.

Since December 2017, *Line of Sight*, a permanent art installation featuring three rotating signs erected on the JPL Mall, has oriented passersby to distant space missions' destinations, such as Uranus, Pluto, and Neptune.

Every 20 seconds, the signs' LED screens pivot in a new direction and change their displays as they receive real-time mission data on spacecraft and planet positions. A nearby sign reads: "Connect to the cosmos. Above your head, below your feet, and in any direction you point, lurks outer space. Hundreds of spacecraft orbit our tiny planet, and a few roam around other worlds." Lois Kim, the JPL visual strategist who created the concept for *Line of Sight*, worked with a team of engineers and data coders to translate her idea into reality. She says JPL employees are excited to see their missions on the signs, and she has added a few new ones at their request. For visitors, Kim hopes the signs will give a sense of the vast scope of the Lab's mission and work.



Hana Keller (BS '19)

Caltech has launched #SoCaltech, a social media series designed to celebrate the diverse individuals who give Caltech its spirit of excellence, ambition, and ingenuity. Hana Keller grew up in Seattle surrounded by a family of geologists. She is studying mechanical engineering. Keller recently participated in the annual ME 72 design engineering competition.

For as long as I can remember, I've always told people, "I want to be a doctor." I really want to be able to work one-on-one with a person, and see them, and see what I am doing to help them. Last summer, I took an EMT class and hope to work as a volunteer EMT later in life. Just by being there for someone in trouble, you're making a difference in their life, which I think is really awesome. When I was a kid, I also always used to be very passionate about robotics. So, for my SURF [Summer Undergraduate Research Fellowship] this summer, I'm going to be able to combine both of these passions by working on AMPRO, a lower-limb prosthetic, in the lab of Aaron Ames [Caltech's Bren Professor of Mechanical and Civil Engineering and Control and Dynamical Systems].

For more #SoCaltech, go to magazine.caltech.edu/post/hana-keller

Five Facts About ...

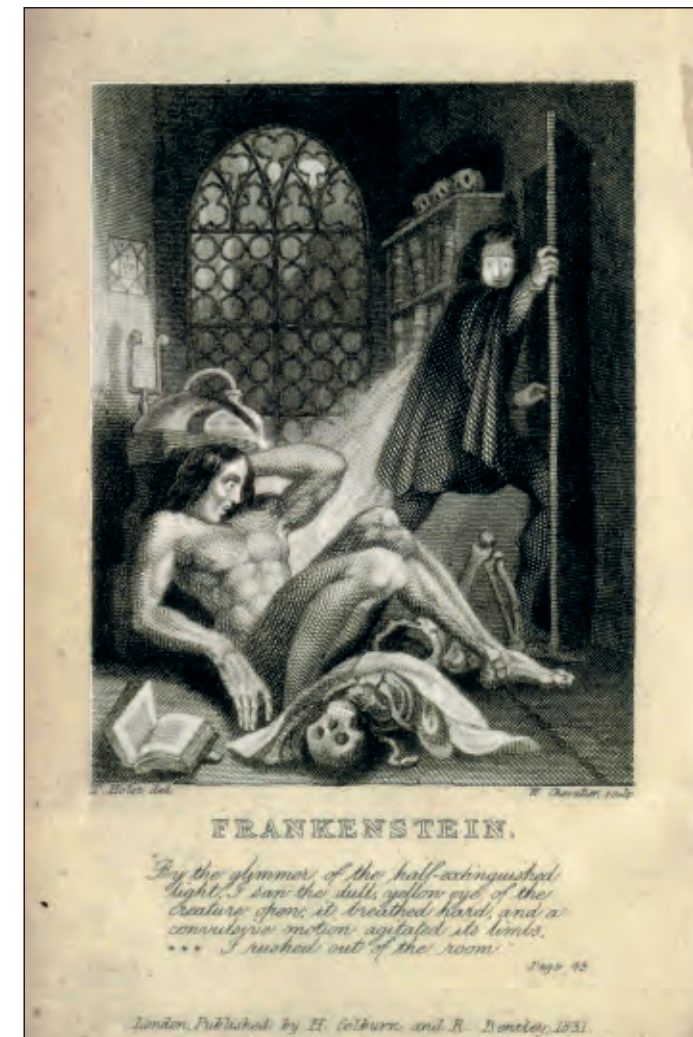
FRANKENSTEIN

With its themes of scientific ambition—and the moral questions it raises about scientific progress—*Frankenstein* is a quintessentially Caltech novel, says Kevin Gilmartin, dean of undergraduate students and professor of English.

"Caltech students do come to it as a novel that is very much about science and, in many ways, it is," Gilmartin says, "but it's also about a lot of other things, and it's always very exciting to present those other dimensions."

To mark the 200th anniversary of Mary Shelley's novel, Gilmartin joined scholars from the Keats-Shelley Association and the Byron Society of America in organizing "Frankenstein Then and Now, 1818-2018," a two-day conference held in May at The Huntington Library, Art Collections and Botanical Gardens. Supported in part by the Division of the Humanities and Social Sciences' Anne Rothenberg Fund for the Humanities, the conference explored *Frankenstein's* enduring influence on art and culture.

"Mary Shelley's *Frankenstein* was engaged with developments in science and medicine," Gilmartin notes. "I find very intriguing the ways in which this novel continues to resonate with our own anxieties around the life sciences."



Above: promotional photo of Boris Karloff from *The Bride of Frankenstein*. Below left: inside cover art from the 1831 edition of *Frankenstein*.

FRANKEN FACTS

1. Mary Godwin Shelley, the daughter of feminist writer Mary Wollstonecraft and philosopher William Godwin, began writing *Frankenstein* in 1816, when she was **18 years old**. She and her future husband, the poet Percy Bysshe Shelley, were visiting Lord Byron at his villa on Lake Geneva in Switzerland when bad weather forced the party indoors and Byron proposed they each write a ghost story. *Frankenstein* was Mary Shelley's submission.
2. The first edition of the novel was **published anonymously**. Shelley's name was added to the second edition of the book, published in 1831, after she had revised it.
3. While the novel has inspired dozens of film adaptations, it is 1931's *Frankenstein*, directed by James Whale, that is responsible for perhaps the most abiding image of Frankenstein's monster: a **square-headed creature** with heavy eyelids and bolts in his neck.
4. The full title of Shelley's work is *Frankenstein; or, The Modern Prometheus*, and it is widely considered to be the **first science-fiction novel**.
5. The Huntington holds a **significant collection** of materials related to Mary and Percy Shelley, including notebooks and letters.



Commencement 2018: Civil Rights Leader John Lewis to Speak

Those attending this spring's Commencement ceremony at Caltech will share Beckman Mall with a true hero of the civil rights movement. U.S. congressman John Lewis, who is slated to be the speaker at the June 15 event, is known as "the conscience of Congress" and has dedicated his life to protecting human rights and securing civil liberties, both through social movements and as an elected official.

He was the youngest of the Big Six leaders behind the 1963 March on Washington, the occasion of Martin Luther King Jr.'s "I Have a Dream" speech, and, two years later, at age 25, led more than 600 peaceful protestors across the Edmund Pettus Bridge in Selma, Alabama. State troopers attacked the demonstrators, a brutal confrontation that would later be recognized as a turning point in the movement and in American history.

"His example of intellectual courage matched by moral fortitude should inspire the class of 2018 as they take their next steps forward in life," Caltech president Thomas F. Rosenbaum said, noting that Lewis's visit comes in the same year in which Caltech observes the 60th anniversary of King's 1958 visit to campus. For more commencement coverage, visit commencement.caltech.edu.



When Aaron Ames, Bren Professor of Mechanical and Civil Engineering and Control and Dynamical Systems, and Grecia Lopez, assistant research scientist in the Division of Geological and Planetary Sciences, tied the knot recently at the Athenaeum, they enlisted the help of one of Ames's colleagues—Cassie the bipedal robot—to serve the role of ringbearer. She didn't miss a step.

"Los Angeles owes its existence to earthquakes. Its location, in the arid Southwest, could have left it an uninhabitable desert had it not been for the mountains that surround it, pushed up by active faults, capturing moisture from the clouds that come off the ocean. ... Faults may have made Los Angeles a viable city, but they are a precarious asset, and the risk of earthquakes is ever present."

—Seismologist Lucy Jones, research associate at Caltech

from The Big Ones: How Natural Disasters Have Shaped Us (and What We Can Do About Them)
Doubleday, 2018



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