



- Why economist Kirby Nielsen started writing haiku
- Meet Caltech's new board chair Dave Thompson (MS '78)
- A historic first for JPL
- Big quantum news; and more

A Study in Sediments

The 2022 photo calendar produced by the Division of Geological and Planetary Sciences (GPS) features winning photographs from a division-wide photo contest. This selection, *Mono Lake Sediments From the Wilson Creek Formation, California*, shows sediment deposits in the lake. The description states: "During glacial times, when Sierra Nevada glaciers extended to their maximum glacial positions, and the lake was greatly elevated, icebergs floated in Lake Russell and deposited drop stones in the Wilson Creek Formation."

GPS research technician Mark Garcia captured this photo on June 20, 2021, while assisting with the International Geobiology training course, a five-week intensive summer program for PhD students and postdocs. At over 1 million years old, Mono Lake is one of the oldest in North America. Salts and minerals have washed into the lake, which has no outlet, from Eastern Sierra streams over time. The interaction of freshwater springs and alkaline lake water led to the formation of "tufa towers," calcium-carbonate spires and knobs notable for their unusual shapes and abundance. These towers have aided science's understanding of the climate history of this region.

"We arrived about two hours before the group of geobiology students," Garcia says of the day he took the photo. "Out of 12 photos I took, this one was my favorite."



New Names

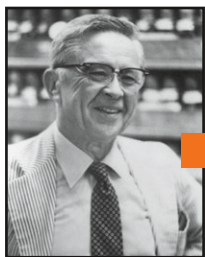


The Caltech Board of Trustees, in accord with recommendations from President Thomas F. Rosenbaum, the Committee on Naming and Recognition, and the Ruddock House Renaming Committee, announced in November 2021 the names that would replace campus assets and honors that previously memorialized individuals affiliated with the eugenics movement:

Caltech Hall (formerly the Robert A. Millikan Memorial Library) recognizes past, present, and future generations of faculty, postdoctoral scholars, researchers, alumni, students, and staff who contribute to the Institute and to society.



The Lee F. Browne Dining Hall (formerly the Harry Chandler Dining Hall) is named in honor of Lee Franke Browne, a longtime educator who worked to address disparities within the country's educational systems. Browne was Caltech's director of secondary school relations for two decades beginning in the 1970s.



The Judge Shirley Hufstедler Professorship (formerly the Robert A. Millikan Professorship) is named in honor of Shirley Mount Hufstедler, the country's first cabinet-level secretary of education (as appointed by President Jimmy Carter), first female federal appellate judge, and a member of the Caltech Board of Trustees for 39 years.

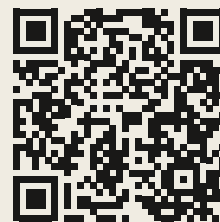


The Edward B. Lewis Professorships of Biology (formerly the Albert Billings Ruddock Professorships of Biology) are named in honor of Caltech alumnus and longtime faculty member Edward B. Lewis (PhD '42), who dedicated his academic career to Caltech and was awarded a Nobel Prize in 1995 for his groundbreaking studies of how genes regulate the development of specific regions of the body.

Grant D. Venerable House (formerly Ruddock House) is named in honor of Grant Delbert Venerable (BS '32), the first Black student to graduate from Caltech. Venerable received his undergraduate degree in civil engineering and went on to work as a mining engineer, and to own and operate a hotel and an eraser manufacturing company.

Caltech to Host Science Olympiad Tournament

The nation's brightest young scientific minds are gearing up for the 2022 Science Olympiad National Tournament, which will be hosted by Caltech on May 13 and 14, 2022. The competition and events will take place online because of the COVID-19 pandemic. Science Olympiad is the premier science competition for middle and high school students. More than 2,000 are expected to take part in the festivities, which will include an opening ceremony; a STEM Expo featuring panels, discussions, and webinars; as well as an awards ceremony on May 18. The theme for this year's competition is "Imagination." Caltech president Thomas F. Rosenbaum will speak at the opening ceremony, followed by a keynote address from Frances Arnold, Linus Pauling Professor of Chemical Engineering, Bioengineering and Biochemistry, and winner of the 2018 Nobel Prize for Chemistry.



Scan the QR code to see an updated version of the Caltech campus map.

For more information, visit: scienceolympiad2022.com

Quantum Quantifying



The new Dr. Allen and Charlotte Ginsburg Center for Quantum Precision Measurement at Caltech will develop tools and concepts with the potential to influence all areas of science and technology through unprecedented sensing, measurement, and engineering capabilities.

As the fulcrum of a major initiative in quantum science and technology, the center will unite a diverse community of theorists and experimentalists devoted to understanding quantum systems and their potential uses. It will bring together researchers in three fields that progress hand in hand: quantum sensing; quantum information; and gravitational-wave detection, the direct observation of ripples in spacetime.

The center will be housed in a new six-story building to be constructed with the support of a donation by Dr. Allen and Charlotte Ginsburg. The new building will bring architectural innovation to a historic, central campus entrance on California Boulevard. It will feature four floors of airy interaction spaces and offices built atop two floors of state-of-the-art underground laboratories made possible through a grant from the Sherman Fairchild Foundation. The entire project is fully funded by philanthropy.

The subterranean labs will be named for Kip Thorne (BS '62), Caltech's Richard P. Feynman Professor of Theoretical Physics, Emeritus. Thorne is among three scientists who shared the 2017 Nobel Prize in Physics for their roles in developing LIGO (Laser Interferometer Gravitational-Wave Observatory).

“In many ways, this feels like a homecoming. Some of the most impactful experiences of my career have taken place on the Caltech campus and at JPL—lessons learned and goals achieved that have shaped me as a leader and a space scientist. I will work every day to ensure that JPL is a place where all belong and thrive. We will dare mighty things, together.”

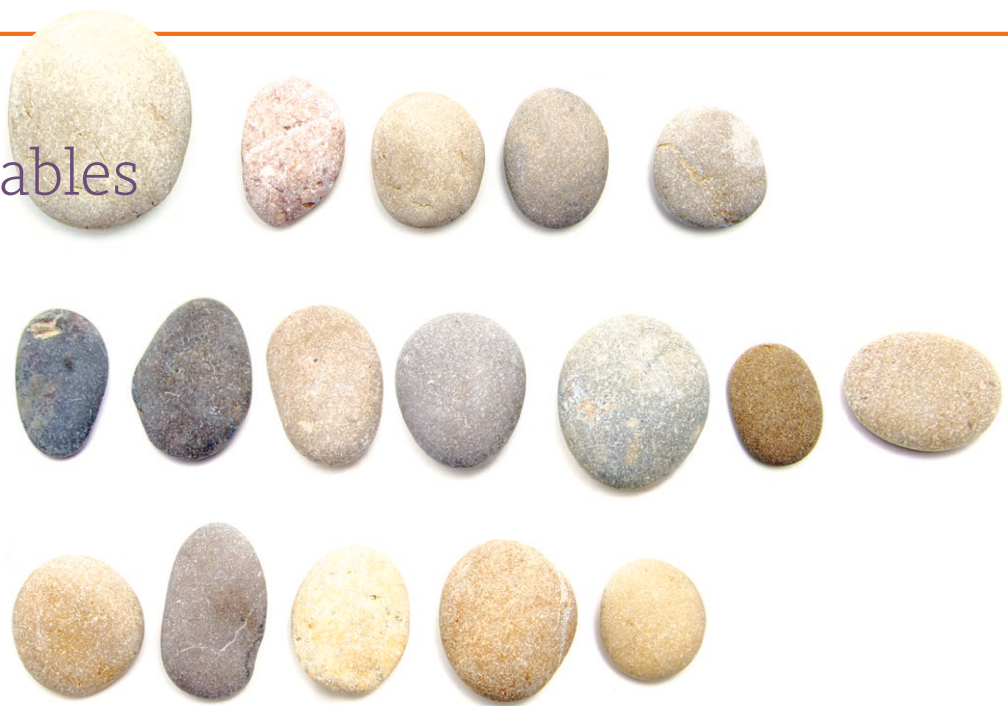


—Laurie Leshin (MS '89, PhD '95), *current president of the Worcester Polytechnic Institute, has been appointed director of JPL and vice president of Caltech. She will be the first woman to lead JPL in the Lab's history and will take on that role beginning May 16, 2022.*

Science in 17 Syllables

Kirby Nielsen, assistant professor of economics, researches individuals' decision-making behavior and uses experiments to study human perception of risk and uncertainty. Her field of experimental economics explores how people make choices involving financial investments, health care, and managerial decisions in the workplace.

Nielsen has added a creative twist to her own workplace behavior. She writes haiku summaries of her research papers, a practice that, she says, helps her think about the most efficient way to describe and present her work. "It takes a lot of time and practice to convey an idea simply and succinctly. That got me thinking that the ultimate challenge would be to communicate the whole story of a paper in just a sentence or two. The haiku structure provides a fun avenue for this and lets me add a little bit of poetry into the science." Here are some of the fruits of her labor:



The paper:

"Preferences for the Resolution of Uncertainty and the Timing of Information"
(*Journal of Economic Theory*, September 2020)



The haiku:

"If it has happened
you want to know it sooner.
Otherwise, you'll wait."

The paper:

"Timing of Communication"
(with Puja Bhattacharya and Arjun Sengupta;
The Economic Journal, August 2020)



The haiku:

"Promises are good
but cooperation fades.
Reports are better."

The paper:

"Teams Promise But Do Not Deliver"
(with Puja Bhattacharya, John Kagel, and Arjun Sengupta; *Games and Economic Behavior*,
September 2019)



The haiku:

"People will promise.
It makes them cooperate.
But don't trust a group!"



Visit Nielsen's website at kirbynielsen.com to read more of her haiku.

Alum-to-Alum

"The joy of discovery is so huge. That's why we all got into it. And without minimizing the difficulties in science, it's important to constantly remind yourself of this because, if not, then the joy of science will go away. And if it goes away, then it's just not worth doing this job."

—Ardem Patapoutian (PhD '96)

Professor of Neuroscience, Scripps Research, and recipient of the 2021 Nobel Prize in Physiology or Medicine

Visit:

magazine.caltech.edu/ardem-patapoutian to watch a video interview between Patapoutian and content and media strategist Lori Dajose (BS '15), in which they discuss his time at Caltech and the research that led to his groundbreaking discoveries of receptors for temperature and touch.

Dave Thompson

New Board of Trustees Chair

In 1976, Dave Thompson (MS '78), the new chair of Caltech's Board of Trustees, participated in a summer program at JPL, which Caltech manages for NASA. There, he helped with NASA's Viking Project, which successfully landed the first spacecraft on Mars.

"We would work according to Mars time, and that didn't always map to Earth time," says Thompson. "I can remember the excitement surrounding the first landing, which occurred around 4 in the morning. Of course, everybody was working all night beforehand."

That was his introduction to the Institute, where, as a graduate student, he would pursue rocket propulsion and control under the guidance of adviser Bob Cannon and collaborator Homer Joseph Stewart (PhD '40), a co-founder of JPL. Thompson credits his Caltech education for helping to shape his entrepreneurial spirit. In 1982, he founded Virginia-based Orbital Sciences Corporation, a designer and manufacturer of space and rocket systems.

As he works with the Caltech Board to define priorities, Thompson sees opportunities to enhance the student experience, scale up research thrusts in areas of increasing focus, secure JPL's future beyond the next decade, and accelerate progress in diversity and inclusion throughout the Caltech community, including the Board of Trustees.

"I'd like to see us continue to support strong investment in our people—faculty, students, postdocs—and facilities, and continue the progress we've made in the last decade or so with fundraising from an expanded group of contributors, even beyond the almost 15,000 individuals who contributed to the *Break Through* campaign," says Thompson, who has been a Caltech trustee since 2012.

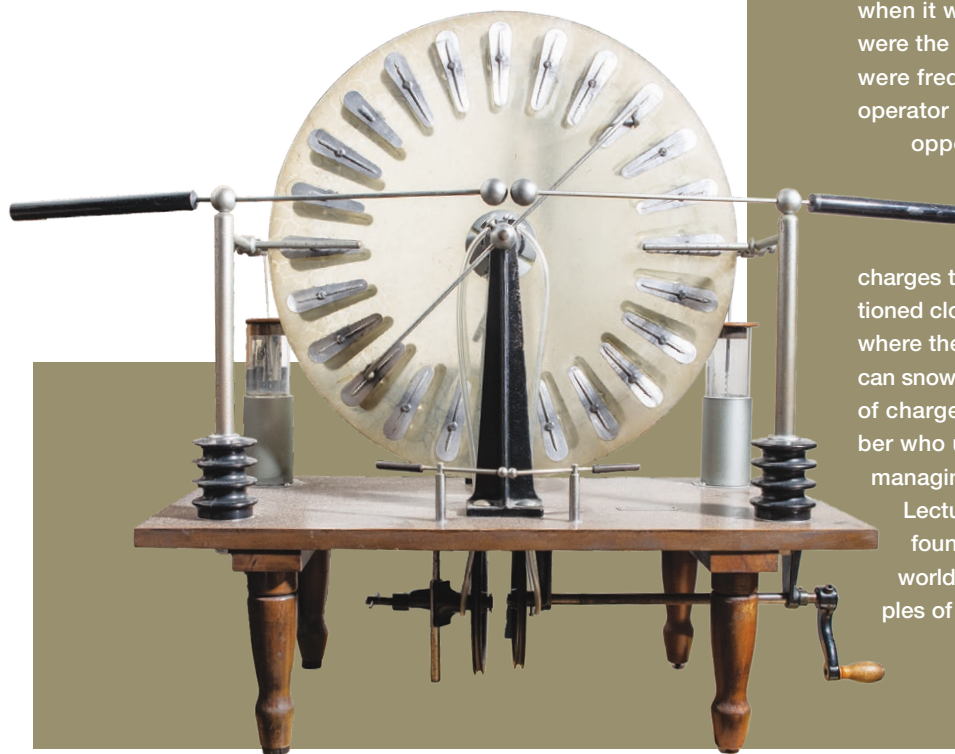
Thompson replaced David Lee (PhD '74), who joined the board in 2000 and was elected chair in 2012. Lee will remain on the board as a senior trustee and chair emeritus and as a member of multiple standing committees. Trustees Barbara Barrett and Ronald Linde (MS '62, PhD '64) were elected to serve as vice chairs.



Object Lesson:

The Wimshurst Machine

Developed in the 1880s by British inventor James Wimshurst, this spinning contraption generates the same kind of static electricity that makes your hair stand on end. In the era when it was invented, electrostatic machines of this sort were the primary means of generating high voltage and were frequently used to power X-ray tubes. When an operator turns the machine's crank, its two wheels spin in opposite directions. Small electrical charges on the discs are amplified and gathered in two jars, one for positive charges and the other for negative ones, placed on either side of the wheels. The charges then travel through rods to two metal balls positioned close to each other in front of the spinning wheels, where they are discharged as giant sparks. "This process can snowball, creating up to hundreds of thousands of volts of charge," explains Zach Tobin (MS '13), a staff member who uses this Wimshurst machine as part of his job managing physics demonstrations for Caltech's Feynman Lecture Hall. The machine can be found in classrooms around the world as a tool to teach the principles of electrostatics.



Watch a video about Zach Tobin and physics demonstrations:



Newton Nguyen (fifth-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.

Newton Nguyen (MS '19) is a fifth-year graduate student in environmental science and engineering. Through his research with Christian Frankenberg, a professor of environmental science and engineering and JPL research scientist, he aims to develop a new greenhouse gas observation network to monitor carbon emissions. Nguyen, who lost his eyesight at age 12 due to a degenerative vision condition, co-founded the Caltech Disability Coalition with Krystal Vasquez, a graduate student in chemistry. In his spare time, Nguyen runs marathons and competes in triathlons. He helped found the Caltech Triathlon Club and serves as its president.

"I went to geophysics, then to climate science and math. It's a lot of visual data, but I generate the plots myself with my own code. I can listen to my computer read the code aloud and understand what's being typed out. There are three steps I use to understand the data. Number one is developing the code to actually generate the figures to look through the data. The second is looking through different statistical measures to understand what the data looks like, but that only gives you a coarse picture of what's going on. Third, I sit down with my adviser, collaborators, or even just other friends at Caltech and discuss the details in the figures. I learn insights that I didn't catch when they described the data to me. It took a year or two to figure it out, but it ended up working. In many ways, having to do all these workarounds for conventional pathways can help you out because you have to think outside the box. I can't take anything for granted.

I've learned a lot from my colleagues at Caltech and my running guides, friends to whom I am literally tethered when I run. They tell me where to go, look out for obstacles, and give me feedback on my technique and pacing. It's a team effort, and when we cross the finish line, we do it together."



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

Five Years of Data

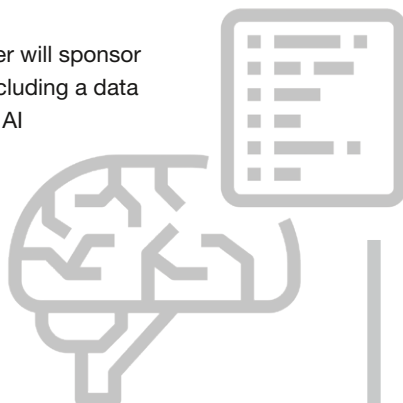
A half decade after its inception, the Tianqiao and Chrissy Chen Institute for Neuroscience at Caltech has expanded to include a new center in data science and artificial intelligence (AI).

Breakthrough techniques in neuroscience generate enormous data sets, such as recordings of the ongoing activities of thousands of neurons and videos of complex animal behavior. But often, neuroscientists have not had formal training in the data science and machine learning methods required to analyze and interpret big data.

Now, the Chen Institute will develop the Chen Center for Data Science and Artificial Intelligence (DataSAI). Lior Pachter (BS '94), Bren Professor of Computational Biology and Computing and Mathematical Sciences, and Pietro Perona, Allen E. Puckett Professor of Electrical Engineering, will serve as co-directors of DataSAI. The Chen Institute is directed by David J. Anderson, Seymour Benzer Professor of Biology and Howard Hughes Medical Institute Investigator. Anderson also holds the inaugural Tianqiao and Chrissy Chen Institute for Neuroscience Leadership Chair.

The center will sponsor programs including a data science and AI boot camp, as well as workshops for students to learn how to interpret large data sets. Caltech students will also have access to the technical equipment to generate and analyze data, and the center will provide them with opportunities for summer internships at off-campus research centers specializing in data science and AI.

Says Pachter: "We are all very excited about the opportunity to develop a program that could lead to the establishment of the Chen Institute at Caltech as an international center for training neuroscience students in data science and artificial intelligence."



Faces of Psyche

Later this year, a NASA satellite named Psyche will survey a metallic asteroid of the same name to learn more about how it was made, whether it formed in conditions like those of Earth's core, and what its surface looks like. Here on Earth, Psyche's far-out features will be displayed online thanks to the work of Caltech senior Jennah Colborn.

Colborn is not only a physics major who studies astrobiology to search for extraterrestrial life but also an artist who showcases the cosmos in a variety of media to inspire researchers and make science relatable. This double fascination with the stars led her to start an internship last fall with Psyche Inspired, a program that brings together undergraduate students from a variety of disciplines to create artistic works related to the Psyche mission.

For her first of four projects, titled *Faces of Psyche*, Colborn used makeup and digital photography to bring some of the asteroid's physical features to life through a series of portraits featuring other Caltech students.

The first portrait, of senior Ayooluwa Odemuyiwa, illustrates the asteroid's asymmetry and unique shape. The second, of junior Isaiah Curtis, shows one aspect of the asteroid's composition: silicate rock and crystal. The third portrait, of senior David Oliveira, depicts perhaps the most iconic feature of the asteroid: its metal-rich composition. The fourth, of sophomore Emma Gurcan, displays a common feature among asteroids like Psyche: space weathering.



To view all of the Psyche Inspired projects, visit: psyche.asu.edu/get-involved/psyche-inspired

PROCESSION in Person

On October 16, 2021, Caltech celebrated its 2020 and 2021 graduates with an in-person fall commencement event on Beckman Mall in which 299 recent alumni (206 bachelor's, 15 master's, and 78 PhD degree recipients) were afforded their long-awaited opportunity to hear their names read and to process across a stage in front of nearly 600 alumni, friends, and family members. Those who had received their PhDs during two previous virtual commencement ceremonies were hooded.

The event, held in conjunction with the Caltech Alumni Association's Reunion Weekend, brought a number of other graduates back to Pasadena. In attendance at the celebration were three of the 2021 Distinguished Alumni Award recipients: Col. Robert Behnken (MS '93, PhD '97), who offered the keynote address; Barbara Burger (PhD '87); and Laurie Leshin (MS '89, PhD '95), who has since been appointed director of JPL.



Security
possibilities *integrity*
**We Give You
Peace of Mind**



trust *value*
**Exclusively serving the
extended Caltech community
and their families for over 70 years.**



solutions *stability*
800/592-3328 • www.cefcu.org

growth *service*
Must qualify for CEFCU membership to join. Minimum \$5 deposit and one-time \$5 membership fee due upon opening any CEFCU share account.
Federally insured by NCUA.

**Proud sponsor of the Caltech Alumni Association,
The Associates, Caltech Y, and CaltechLive!**