

A large, multi-level atrium with a wooden balcony, a whiteboard, and students walking and working. The scene is brightly lit with warm tones. In the foreground, three students are sitting on a brown leather sofa around a glass coffee table, working on laptops. One student is wearing a yellow jacket, another a blue plaid shirt, and the third a blue t-shirt. In the background, a group of students is walking on the ground floor, and others are on the balcony. A whiteboard is mounted on the wall behind the sofa. The floor is made of large, hexagonal tiles. The overall atmosphere is one of a busy, collaborative academic environment.

2023 YEAR **in** REVIEW



GREETINGS from the Chair

These pages tell of the latest developments in our research, the newest additions to our faculty, important work done on the teaching front, and honors and awards for faculty and students. It's been a busy and productive year in HSS!

The feature article we introduced last year was so well received that we've decided to continue the tradition. This year we look back on more than 50 years of policy-relevant work by HSS scholars, which laid the conceptual groundwork for one of our newest initiatives: the Center for Science, Society, and Public Policy (CSSPP). The new center builds on the interdisciplinarity at the core of Caltech research and connects HSS in concrete ways to other divisions and the world beyond. CSSPP aims to tackle some of the most pressing problems of our time—including AI, bioethics, and climate change—through a collaborative policy-centered approach. Its inaugural year was marked by seminars, workshops, and public events, and there are a variety of new initiatives planned for 2024.



The enthusiasm surrounding the new CSSPP is a timely reminder of the centrality of the humanities and social sciences to the pursuit of scientific discovery and technological innovation at Caltech. Indeed, the study of human societies and humanistic values is particularly relevant and necessary in these challenging times, and that effort is integral to the research and teaching we do in this division.

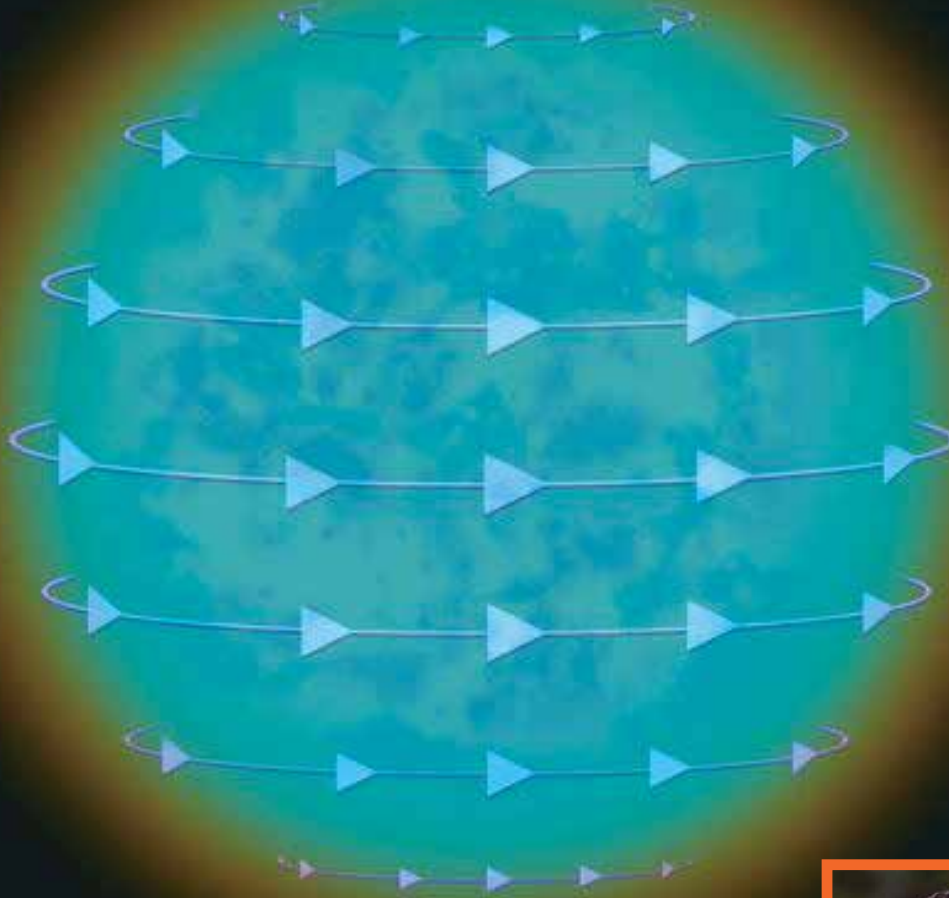
Tracy Dennison

Edie and Lew Wasserman Professor of Social Science History

Ronald and Maxine Linde Leadership Chair, Division of the Humanities and Social Sciences

2023 YEAR **in** REVIEW

WINTER

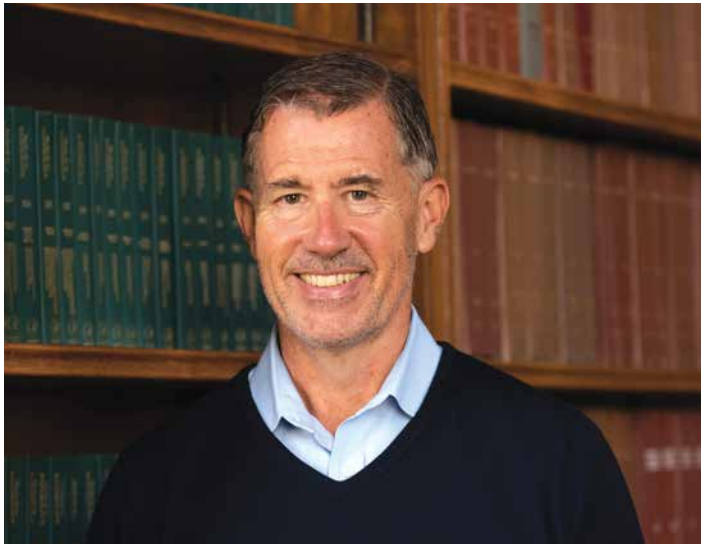


Do Electrons Spin?



While many physicists will tell you that electrons are not *really* spinning—they merely act like it—Professor of Philosophy **Chip Sebens** is rethinking this notion. As a philosopher of physics, he wants to figure out what is going on at the deepest levels of nature. “In quantum mechanics, we have ways of predicting the results of experiments that work very well for electrons and account for spin, but important foundational questions remain unanswered: Why do these methods work, and what’s happening inside an atom?” Sebens told *Caltech News*. In several studies, he outlined why he thinks an electron is not a point-size particle that merely acts like it is spinning but rather is a spread-out blob of charge that truly rotates. Sebens’s ongoing research on electron spin was featured in *Scientific American*.

Combating Bad Behavior Online



Whether it's trolling, racism, sexism, doxing, or just general harassment, the internet has a bad-behavior problem. Researchers from Caltech, including **Mike Alvarez**, professor of political and computational social science, and Activision Publishing, a video game publisher, are collaborating to address this behavior in video games. The sponsored research agreement brings together Activision's data engineers, who provide insight into player engagement and game-driven data; Alvarez, who has used machine-learning tools to study political trends in social media; and Anima Anandkumar, the Bren Professor of Computing and Mathematical Sciences, who has trained AI to fly drones and study the coronavirus. "This new direction, with our colleagues at Activision, gives us an opportunity to apply what we have learned to study toxic behavior in a new and important area—gaming," Alvarez told *Caltech News*.

Reviving the Past with Artificial Intelligence

While studying John Singer Sargent's paintings of wealthy women in nineteenth-century society, **Jessica Helfand**, HSS's winter 2020 artist in residence, had an idea: to search census records to find the identities of those women's servants. "I thought, 'What happens if I paint these women in the style of John Singer Sargent?' It's a sort of cultural restitution," Helfand explained to *Caltech News*. At a February event, she discussed her process with **Hillary Mushkin**, research professor of art and design. The talk, part of the Caltech-Huntington Program in

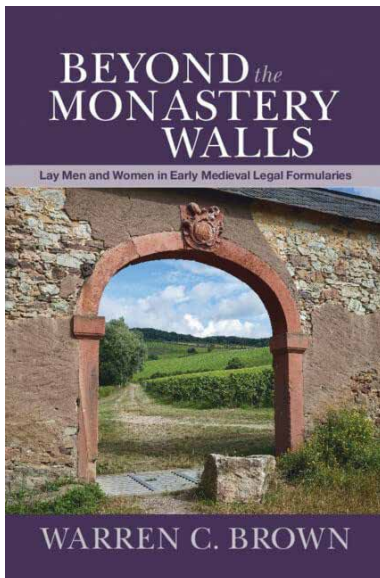


Helfand self-portrait



Visual Culture, also featured Joanne Jang, product lead at DALL-E, an AI system that generates images based on user-supplied prompts. Helfand and Jang spoke about recent advancements in generative AI, ethical considerations when using such tools, and the distinction between artistic intelligence and artificial intelligence.

Ordinary Early Medieval Lives



In his recent book, *Beyond the Monastery Walls: Lay Men and Women in Early Medieval Legal Formularies*, Professor of History **Warren Brown** pieces together the lives of the ordinary people of early medieval Europe through the legal documents they left behind. The fact that his book focuses on the lives of ordinary people makes it different from much of the scholarship on the period, which has often centered on aristocrats like kings, queens, or dukes or, especially, on the Catholic Church and its officials. To learn not only about economic transactions, like property sales, gifts, or exchanges, but also about such things as marriages, divorces, and other elements of daily life, Brown analyzed a trove of documents from monasteries, where commoners went for legal paperwork. “What’s surprising—particularly given modern stereotypes about the illiterate Dark Ages—is just how pervasive writing was,” Brown told *Caltech News*. Brown’s latest book was also featured in the spring 2023 issue of *Caltech* magazine.



How the Brain Creates Your Taste in Art

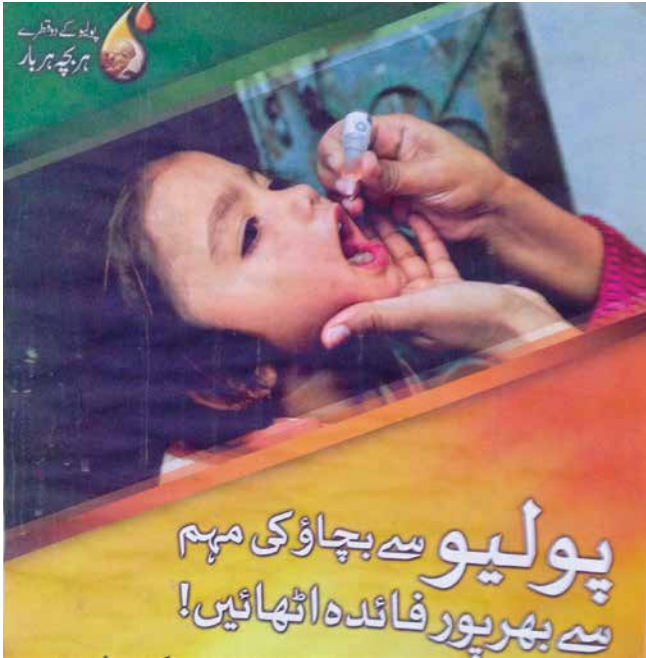


Research from the lab of **John O’Doherty** (above left), the Fletcher Jones Professor of Decision Neuroscience, revealed the neural basis for aesthetic preferences in humans using a combination of machine learning and brain-scanning equipment. In a paper published in *Nature Communications*, Caltech researchers led by former O’Doherty postdoc **Kiyohito Iigaya** (above right), now an assistant professor in neurobiology at the Columbia University Irving Medical Center, show how the brain breaks down a piece of art into its essential

qualities—contrast, hue, dynamics, and concreteness—and then decides whether those qualities are pleasing or not. The researchers say their findings suggest that this “value construction” system may be widespread throughout the brain and may explain many kinds of preferences. “I think it’s amazing that this very simple computational model can explain large variations in preferences for us,” Iigaya told *Caltech News*.



Reducing Procrastination with Tailored Incentives



Polio vaccination drive advertisement

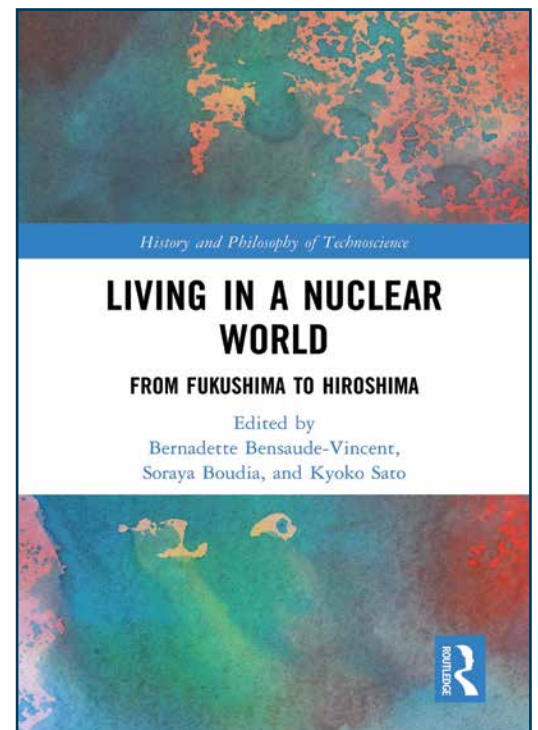
Procrastination is common, but that does not mean it is harmless.

For Professor of Economics **Charlie Sprenger**, procrastination is a problem that can be solved with the tools of his trade, and he has started in a place where its effects can be acute: health care. In a paper published in the *Journal of the European Economic Association*, Sprenger and colleagues show how they used economics principles, including tailored incentives, to tackle the problem of procrastination during polio vaccination drives in Pakistan. “It didn’t need to be Pakistan, it didn’t need to be government health workers. It could have been anything,” Sprenger told *Caltech News*. “This fits into a bigger agenda of using the tools of experimental economics to measure preferences and change incentive schemes based on those measurements in an individualized way.”



Eight Decades of Living with Nuclear Technology

This year’s William & Myrtle Harris Distinguished Lectureship in Science and Civilization, held on February 17, featured a panel on nuclear technology and its role in shaping the world we live in. With Caltech’s Joseph E. Shepherd, the C. L. “Kelly” Johnson Professor of Aeronautics and Mechanical Engineering, serving as moderator, panel participants discussed how nuclear technology has profoundly affected world history and geopolitics as well as our daily life and the natural world since the Trinity test and the bombings of Hiroshima and Nagasaki. The conversation was prompted by the publication of the book *Living in a Nuclear World: From Fukushima to Hiroshima*, authored by panel participants Bernadette Bensaude-Vincent, professor of history and philosophy of science and technology (emeritus) at Paris 1 Panthéon-Sorbonne University; Soraya Boudia, professor of science, technology, and society at Paris Cité University; and Kyoko Sato, associate director of the program in science, technology, and society at Stanford University.





Charting New Paths

Caltech magazine interviewed undergraduate **Aanica Gonzales-Rogers** about her experience as a teaching assistant for Research Professor of Art and Design **Hillary Mushkin**'s winter 2023 course Careers in STEAM, which introduced students to new ways of combining art and science. "I found a bunch of speakers to bring in who could share their career paths—we had a science writer, a Disney Imagineer, an industrial designer, and others come speak," Gonzales-Rogers said. "I want students to know that they have options within science to do art—it's not just academia or bust. I'm hoping that I can leave behind a legacy of connection between art-science careers and Caltech students." Gonzales-Rogers graduated in June, with a major in computation and neural systems.

SPRING

Celebrating Phil Hoffman

After more than four decades of scholarship and teaching, **Philip T. Hoffman**, the Rea A. and Lela G. Axline Professor of Business Economics and History, Emeritus, retired from the Institute this year. His work—which combines economic theory and historical evidence to explain long-term changes in politics, society, and the economy—explores a wide range of topics, such as changes in technology that influence agriculture, the development of financial markets, why financial crises occur, and the development of tax systems. In April, a two-day conference was held in his honor. Historians, political scientists, and economists from around the world gathered to discuss Hoffman's body of work and give a series of talks on such historical subjects as the economic effects of slavery, fiscal federalism in public school finance, and the legal foundations of the Industrial Revolution.





Habit Formation Has No Set Timeline

Research published in the *Proceedings of the National Academy of Sciences* showed how long it takes to form a gym habit (about six months) and how long it takes health-care workers to form the habit of washing their hands (a few weeks). “There is no magic number for habit formation,” **Anastasia Buyalskaya** (PhD '21) (above right), lead author of the paper and now an assistant professor of marketing at HEC Paris, told *Caltech News*. She and study collaborators, including **Colin Camerer** (above left), the Robert Kirby Professor of Behavioral Economics and director and leadership chair of the T&C Chen Center for Social and Decision Neuroscience, employed machine learning to analyze large data sets derived from people who were either swiping their badges to enter the gym or washing their hands during hospital shifts.



A Conversation with Eric Mazumdar

Many academics choose to study one thing and one thing only. **Eric Mazumdar**, who talked to *Caltech News* about his background and research interests, is not one of those academics. As an assistant professor of computing and mathematical sciences and economics who joined Caltech in 2021, he uses tools and ideas from economics to understand emerging problems in machine learning. Mazumdar, who holds degrees in electrical engineering and computer science (BS '15, MIT, and PhD '21, UC Berkeley), is particularly interested in algorithms that are being deployed in everyday life for decision-making. “If these algorithms are making consequential decisions for people, we have to take into account people’s objectives and people’s preferences and how people reason,” Mazumdar said. “Instead of reinventing the wheel, I think that there’s a huge amount of benefit we can get from integrating ideas in economics into algorithm design and machine learning.”



Teaching and Writing in the Era of ChatGPT

For years, **Susanne Hall** has watched computer scientists develop AI tools that write, or at least automatically generate, text. As part of the Caltech Science Exchange, which aims to bring insight and expertise to critical topics in science and engineering, Hall shared her thoughts about the changes to come in teaching and writing as text-generating AI evolves. “Chat tools are wrong a lot, and they fabricate information, and yet they seem like reliable interlocutors,” said Hall, who is a teaching professor of writing at Caltech and director of the Institute’s Hixon Writing Center. “Teaching critical reading strategies will continue to be important. Generative AI tools may become good at summarizing text, which is useful in some contexts. In others, reading critically is important. It cannot be outsourced to a tool that doesn’t think and isn’t actually reading.”

Francis Bacon Conference Explores Astronomy and Astrology

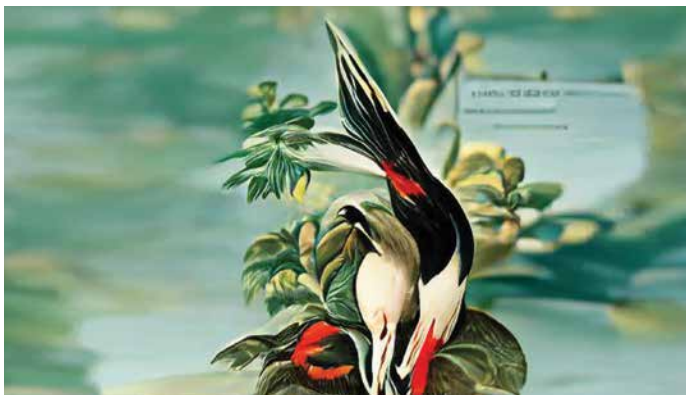
Caltech's ninth Francis Bacon Conference, titled "Thematic Continuities in Astronomy and Astrology from Antiquity to the Renaissance: A Conference in Memory of Noel M. Swerdlow," was held in May. Swerdlow, who was a visiting associate in history at Caltech and a professor emeritus of history, astronomy, and astrophysics at the University of Chicago, passed away in 2021. **Francesca Rochberg**, the 2022 Francis Bacon Award recipient, gave a public lecture on "Babylonian Horoscopy and Genethliology." Rochberg, the Catherine and William L. Magistretti



Distinguished Professor of Near Eastern Studies at UC Berkeley, is the world's leading expert on the history of Babylonian astronomy and astrology, focusing on the second and first millennia BCE—the foundation for the development of astronomy among the Greeks.



Queering Data to Imagine New Ways of Understanding



In research, accurate data is usually imperative. But Caltech's spring 2023 artist in residence, **Maya Livio**, is engaged in a different kind of research: "queering" data by supplementing actual data with speculative, AI-generated information in order to question assumptions, expose biases

in data-collection processes, and imagine new ways of understanding the world. Livio's work as an assistant professor of climate, environmental justice, media, and communication at American University's School of Communication encompasses research, creative practice, curation, and activism. While at Caltech, she taught a course called Environmental Media in Practice and developed an expanded media project called "Salvaging Birds." "Working with Caltech students has been really lovely," Livio told *Caltech News*. "The fact that they're so open to critical perspectives and understand the value of adding those to the work they do in science and engineering is incredible."



SUMMER

Undergraduate SURF Students Explore Autism

As a second-year student, **Ava Barbano** spent the winter and spring of 2023 working in the laboratory of **Ralph Adolphs** (PhD '93), the Bren Professor of Psychology, Neuroscience, and Biology. Barbano extended her work into the summer through Caltech's SURF program, analyzing data from a webcam-based eye-tracking system called WebGazer. The program allows researchers to study atypical gaze behavior in autism, she told *Caltech News*. **Natasha Hong**, also in her second year at Caltech, spent her summer in the Adolphs lab as well, helping to pioneer methods of studying pupil dilation while participants watch naturalistic movies.



Undergraduates Hong (left) and Barbano (right)

Preliminary findings demonstrate that autistic participants show atypical pupil dilation patterns. Further study may reveal that this technology can be used to help diagnose and better understand autism. "Originally, I thought this was mainly about analyzing the dataset," said Hong in a *Caltech News* story. "But then I had the opportunity to interact with autistic participants as well."

WAVE Alumnus Returns to HSS for Grad School

Noah Okada, who joined Caltech as a social and decision neuroscience graduate student this fall, isn't conducting research at the Institute for the first time. In the summer of 2022, he was a member of the WAVE Fellows research program for undergraduates who have been underrepresented in STEM and higher education. As a Chen Institute BrainWAVE Fellow, Okada worked with **Dean Mobbs**,



professor of cognitive neuroscience and director and Allen V. C. Davis and Lenabelle Davis Leadership Chair of the Caltech Brain Imaging Center, to study how the human brain computes escape and reward decisions in situations of threat. Now, as a graduate student, Okada is continuing that work. "Coming from a low-income family with limited exposure to academia, the WAVE program was pivotal in shaping my perspective and understanding of careers in research, as well as [exposing me to] the dynamic academic environment at Caltech," he said to *Caltech News*.



Experimental Economics in Theory and Practice

In a quest to help students construct hypotheses about human behavior, test them, and share the results, Caltech’s summer program in theory-driven experimental economics, now in its second year, ran a weeklong intensive from June 20 to 24. This year’s summer program brought students from UC Santa Barbara, University of Michigan, UC San Diego, Ohio State University, Columbia University, Princeton University, and UC Berkeley to the Caltech campus. “This is the first

opportunity we’ve had where we can meet grad students from the same department at different universities,” **Jack Adeney** (above left), a doctoral student in the social sciences who came to study at Caltech by way of NYU Abu Dhabi and the University of Cambridge, told *Caltech News*. The summer program is supported by HSS’s Center for Theoretical and Experimental Social Sciences (CTESS) and The Ronald and Maxine Linde Institute of Economic and Management Sciences.

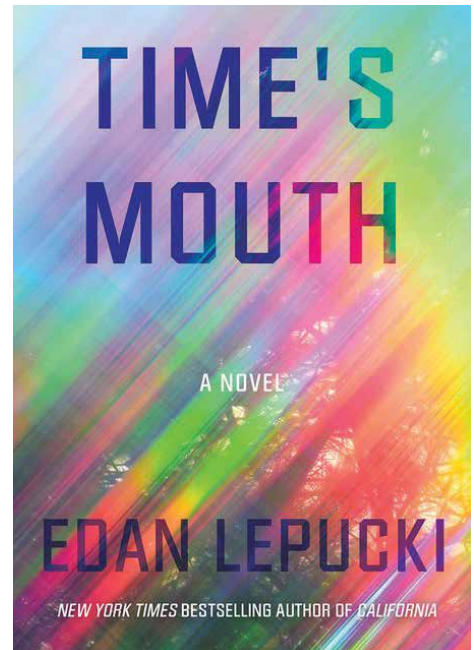
Introducing Axel Niemeyer

Assistant Professor of Economics **Axel Niemeyer** joined the HSS faculty this summer after earning a PhD in economics from the University of Bonn in Germany. His research is focused on a subfield of economic theory called mechanism design. The goal of his work is to find mechanisms—such as rules for allocating goods or making collective decisions—that lead to desirable outcomes even if the participating agents, who have their own set of goals and information, behave strategically. Look for more information about Niemeyer’s research in the 2024 Year in Review.



A Novelist in the Classroom

Edan Lepucki, a lecturer in creative writing who has been teaching Caltech students since 2021, published her third novel, *Time's Mouth*, this summer. It begins with a character born in 1938 who travels to San Francisco in the 1950s to escape her abusive family and then, through circumstance and strange natural abilities, finds herself at the head of a women's commune in the woods outside Santa Cruz. The *New York Times* and the *Los Angeles Times* are among the many publications to have given the book sparkling reviews. Asked by *Caltech News* about teaching at Caltech, Lepucki said, "Caltech students 'run the gamut.' Some students wrote novels when they were in high school or are currently working on a book or stories, and some have never written anything, or maybe only a single assignment in high school." She added that all of her students love to read, though, "so it's nice for them to enjoy that pleasure and that hobby."



Introducing Hannah Druckenmiller

Caltech News interviewed **Hannah Druckenmiller**, who joined the Caltech faculty in the summer as an assistant professor of economics and a William H. Hurt Scholar. An environmental economist, Druckenmiller focuses on governmental policies concerned with preserving natural resources. She is affiliated with the new Center for Science, Society, and Public Policy (CSSPP) and says that it was a big draw for her. "The center supports engagement between science and policy, with priority research areas including climate change and sustainability and artificial intelligence (AI)," she explained. "I'm increasingly interested in how we can use AI systems to improve the monitoring and enforcement of environmental regulations." Druckenmiller earned her PhD in economics at UC Berkeley and most recently worked for Resources for the Future (RFF), a nonprofit in Washington, DC, focused on environmental economics and policy research.



Celebrating a Tradition of Postdocs in the Humanities



Former postdoctoral instructor Leah Klement with students

Postdocs in the humanities are relatively rare, but at Caltech, the postdoctoral teaching program has helped to keep humanities instruction and research at the forefront of the Institute's mission. This fall, *Caltech News* looked back at the history of the program, interviewing alumni who shared fond memories of their research and teaching experiences at the Institute. Alumni of the program were uniformly enthusiastic about their time with Caltech undergrads, and many specifically recalled how supportive Caltech was of its humanists.

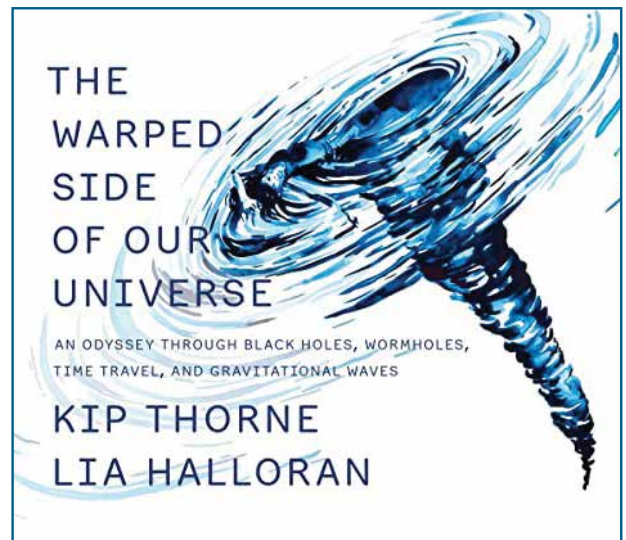
Julia Hori, a postdoc in 2020–21 and now an assistant professor of postcolonial and Caribbean literatures at the University of Cambridge, remembers her humanities and social science colleagues as “such open and generous interlocutors when it came to teaching and research. I think being at a tech institution where we were in the minority put a greater emphasis on community building as a socially and intellectually vital resource.”

Warping Spacetime in Art and Verse

A creative collaboration from Nobel Prize–winning physicist Kip Thorne (BS '62), Caltech's Richard P. Feynman Professor of Theoretical Physics, Emeritus, and **Lia Halloran**, who was an HSS artist in residence in winter 2022 through the Caltech-Huntington Program in Visual Culture, hit the shelves on



October 31. Their book, *The Warped Side of Our Universe: An Odyssey through Black Holes, Wormholes, Time Travel, and Gravitational Waves*, features Thorne's poetic verse and Halloran's otherworldly paintings. “Kip's words get you to one part of the experience and the painting then takes you over,” Halloran, who has been working on the book with Thorne for 13 years, told *Caltech News*. “You can't rely on one or the other to understand these things. You must experience them in tandem.”



Peripheral Visual Information Affects Choice



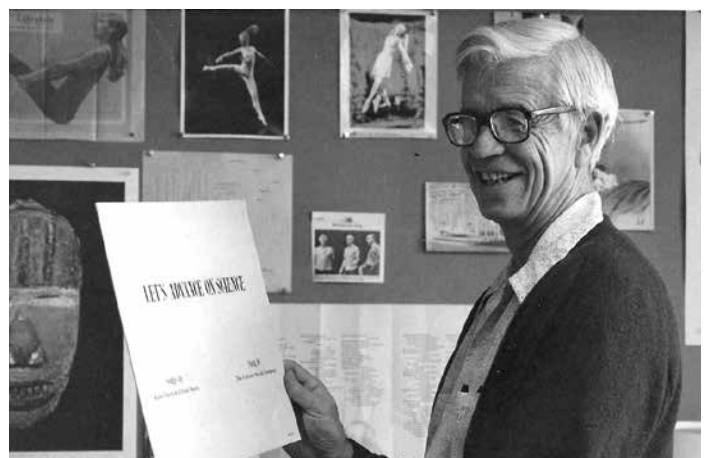
Researchers have long known that decision-makers are more likely to select items that they look at more during the choice process. But what happens if the item that a decision-maker is not focused on is removed, so that it doesn't even appear in their peripheral vision? This is the question that Caltech social and decision neuroscience graduate student and Chen Graduate Fellow **Brenden Eum** (above left), working with Stephanie Dolbier (BS '18) of UCLA and **Antonio Rangel** (above right), Bing Professor of Neuroscience, Behavioral Biology, and Economics, sought to answer experimentally. Their findings were published this fall in *Psychological Science*. “We know that if you're indifferent between two things when you come into a store, you're more likely to choose an object if I can get you to pay more attention to it. This research shows that if I remove one option from your immediate visual field, you'll be twice as likely to choose the one you're looking at,” Rangel told *Caltech News*.

Rangel Testifies in Google Antitrust Case

In September, **Antonio Rangel** provided expert testimony on behalf of the U.S. Department of Justice (DOJ) in an antitrust suit against Google based on the dominance of its search engine. According to trial coverage by Reuters and the *New York Times*, among others, Rangel testified that “consumers were likely to stick with browsers on computers and mobile phones that were pre-installed as the default application,” and that “defaults have a powerful influence on consumer decisions.”

The Professor of Musical Comedy

Caltech magazine recently featured a profile of **Kent Clark**, a former Caltech English professor who was known at the Institute for his musical comedies, which celebrated, and gently teased, the likes of Linus Pauling, George Beadle, and other eminent Institute scientists while shining a fond light on the quirks of campus life. “If you can't write comedy about Caltech, you can't write comedy,” said Clark in a 1989 oral history interview for the Caltech Archives. Clark, who died in 2008, was a onetime chairman of the Beckman Committee, which put on performing arts events, and was generally considered, in his words, Caltech's “de facto commissar of culture.”



CSSPP: The First Year



In 2023, Caltech established the Center for Science, Society, and Public Policy (CSSPP) to address the profound implications that the latest scientific discoveries will have for human societies. Concerns over new advancements in artificial intelligence and the rapid pace of climate change have increased the demand for policy interventions. The CSSPP brings together researchers from across the Institute to work on these problems—engaging the next generation of scientists and engineers in science policy while shaping policy through the work of established experts.

“We produce so much fantastic science at Caltech,” said **Frederick Eberhardt**, professor of philosophy and co-director of CSSPP with **R. Michael Alvarez**, professor of political and computational social science. “And there is this enormous disconnect to policymaking, to the impacts on society, and to ethics questions that I think we really need to address.”

Affiliated with The Ronald and Maxine Linde Institute of Economic and Management Sciences, the center is focusing initially on climate and sustainability, artificial intelligence, and bioethics while also fostering interest in policy across all disciplines.

CSSPP encourages engagement and collaboration by bringing policymakers and stakeholders to campus for



Eberhardt (left) with Roose

distinguished lectures, discussion panels, and workshops. At its inaugural research conference in September, scholars addressed the phenomenon of conspiratorial thinking from the perspective of disciplines as diverse as English literature, political science, economics, neuroscience, and psychiatry. Alvarez sees this initiative as characteristic of what the center aims to do. “We want to highlight the kind of research that we do in the social sciences, ranging from the quantitative and more observational work to the really detailed psychological neuroscience work that **John O’Doherty**’s group does, and frame it in the context of all the other work that’s going on in the area of conspiratorial thinking,” he told *Caltech News*.

Policy in Progress

BY KATIE NEITH

There is a long tradition of HSS scholars—motivated by social, economic, and political problems and opportunities—conducting research that has an impact on public policy. Starting in the mid-1960s, most of this important work was done by individuals or in small collaborations. But as of 2023, the new Center for Science, Society, and Public Policy is bringing a more formalized framework and collective focus to such efforts, amplifying the interplay between science and society.

CSSPP builds on former achievements to help develop larger collaborations, facilitate contact between policymakers and HSS, and ensure that policy-relevant work that happens at Caltech has the largest possible impact.

As policy work in HSS becomes more of an emphasis, building on decades of foundational work and drawing new faculty and students into applied research, the potential for positive impact is vast, says **Tracy Dennison**, the Edie and Lew Wasserman Professor of Social Science History and Ronald and Maxine Linde Leadership Chair of the Division of the Humanities and Social Sciences.

“So many of the more recent advances in science have policy implications, from the rapid advances in AI to strategies for mitigation or adaptation to climate change,” Dennison said. “The CSSPP aims to bring together scientists, social scientists, and policymakers so that they can share their expertise and work together on solutions to some of modern society’s biggest challenges.”

As we approach the end of CSSPP’s first year, we reflect on the history and range of policy work across HSS over the past six decades that set the stage for today’s advances and highlight examples of current research that could soon affect policy.



CSSPP hosted “Shaping the Future: Societal Implications of Generative AI” in May to explore the societal implications of AI technology and how policymakers might approach its regulation. The afternoon featured a keynote presentation from *New York Times* technology columnist Kevin Roose on the challenges and opportunities that ChatGPT and similar generative-AI technologies pose for our society, followed by a panel discussion moderated by Mike Alvarez with Caltech’s Anima Anandkumar (Bren Professor of Computing and Mathematical Sciences), Justin Levitt of Loyola Law School, and Carly Taylor and Sean Comer from Activision.

The center will also develop a set of undergraduate and graduate courses that cover issues in science policy and ethics. “We want to provide our students with a broader education that goes beyond just the science skills, but also looks at the impacts of how scientific findings affect society,” Eberhardt said. “Our goal is for students and faculty to be able to engage with policymakers and have an impact on the regulations that are ultimately being developed.”



Investigating Impacts of Resettlement

Thayer “Ted” Scudder, professor of anthropology, emeritus, arrived on the Caltech campus before HSS existed in its current form. In 1964, when he joined the division, the social sciences arm was still a year from being formally added to what was then the Division of Humanities.

An anthropologist, Scudder brought his pioneering work on dams and their long-term effects on communities and global ecosystems to the Institute, helping to solidify a focus on the social sciences. Over his career, he conducted numerous studies, spanning multiple generations, to predict the environmental, economic, and sociocultural effects of relocating populations for river basin development. For many years, it looked as if policies based on his work had helped to preserve the lands and livelihoods of millions of people across Africa and in nations elsewhere.

“The magic sentence back then was, ‘The dams are a wonderful way to carry out integrated river basin development and improve the lives of the people who live in that river basin,’” Scudder explained in a 2018 *Caltech News* story about his early work in Zambia and Zimbabwe, which was done in collaboration with another trailblazing anthropologist, the late Elizabeth Colson. “Our baseline study began in 1956. We went back in 1962 to see what was happening to these people who had been displaced, and it looked pretty good.”

The uniqueness of his professional experience investigating the potential effects of dams and resettlement projects led to consultancies and advisory positions with the UN Development Programme, the World Health Organization, the World Bank, and the U.S. Agency for International Development, among other organizations. But his comparative analysis of how communities along dammed rivers responded to the construction of large dams in places like Nigeria, India, China, and Laos eventually made him question the long-term impacts of some of his policy work.

By the early 2010s, Scudder had reversed his stance on dams, and he now believes they do more harm than good. In his 2019 book *Large Dams: Long Term Impacts on Riverine Communities and Free Flowing Rivers*, he estimated that about half a billion people downstream from large dams were worse off because of the dams, with another 40 to 50 million forcibly relocated.

“That’s a significant number of people who are being disadvantaged by these projects,” said Scudder in the 2018 *Caltech News* article. “The people displaced by these dams are often ethnic minorities with their own religious and social systems. These were people who were very poor to begin with, but they were self-sufficient. It turned out the governments weren’t really that interested in the welfare of the very poor, rural people displaced by the dams.”

Expanding Voting Rights

Morgan Kousser, professor of history and social science, emeritus, knows a thing or two about the role of governments—both good and bad—in influencing and enacting policy changes. He joined the Caltech faculty in 1969, and a large portion of his work has concerned minority voting rights.

As a graduate student at Yale taking political science courses, Kousser learned regression analysis, which is a type of statistical modeling that can help find the cause-and-effect relationship between variables.

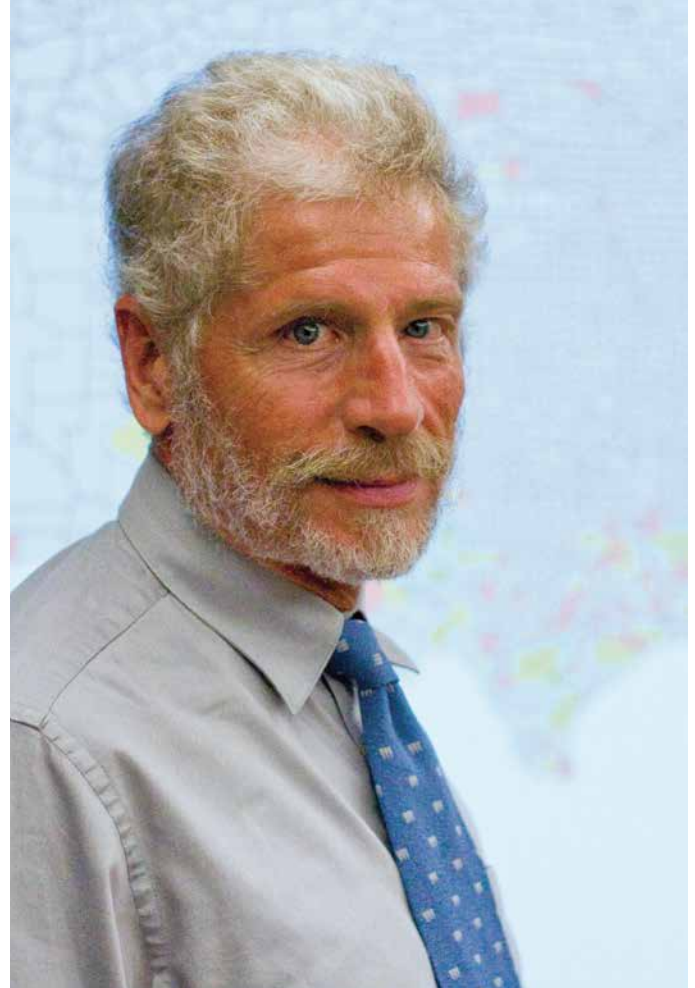
“Once I had chosen to work on disfranchisement, I realized that method would allow me to look at sequential elections and see the proportion of Black people who voted,” he explained. “If you have one election where 60 or 70 percent of Black people voted, but in the next it’s only 20 or 30 percent, you can see when they stopped voting.” Kousser then took that data and began to view voting outcomes through the lens of history.

“If you knew what else was going on—for example, a change in the laws—then you could logically connect it to find out when and why a population stopped voting,” he said. “You could tell all these things using a combination of quantitative methods and qualitative methods like reading newspapers and looking at legislative sources. Nobody else had ever been able to do that. I was perfectly trained to work on the intent of voting rights laws.”

Kousser first served as an expert witness for a voting rights case in 1979. Since then, he’s been involved in dozens of cases and has testified twice before a subcommittee of the U.S. House of Representatives about the renewal of the Voting Rights Act. Kousser explained that “there have been times when my public policy work turns into the basis for a new academic focus. Both of those things are connected in a way that’s circular.”

One of his favorite cases involved working for the Mexican American Legal Defense and Education Fund in *Garza v. County of Los Angeles* in 1990. *Garza* resulted in the election of Gloria Molina, the first Latina politician in 115 years to be elected to the nation’s largest county governing body, after Kousser helped show that the county had engaged in intentional discrimination in the drawing of district lines.

“Gloria Molina was elected to the Board of County Supervisors, and it made a huge difference,” said Kousser.



“She helped settle a case that got a lot of unhoused people off the streets for a time, at least, and that was an immediate impact of a case I helped resolve.”

Kousser retired from teaching in 2020 but is still very active in research and continues to testify, most recently in a Florida redistricting case and a Texas voter suppression case. “One of the things that I wish that Caltech had done more was involve students in policy activities, so I think the formalization of CSSPP will be very good for the Institute’s contribution to public policy and for its education of students,” Kousser said.

Creating a Laboratory for Economic Policy



In the early 1970s, **Charles R. Plott**, the William D. Hacker Professor of Economics and Political Science, Emeritus, pioneered the field of experimental economics at Caltech. He developed methods to test and better understand economic and political theories by creating scenarios under controlled lab conditions to study how people behave in situations that involve, say, group decision-making and the use of incentives.

From the start of his career through his retirement last year, Plott has been at the center of the use of experimental economics to validate complex mechanisms designed by theorists, including himself, to allocate a wide variety of resources. His groundbreaking work informed the distribution of everything from radio waves to fishing rights to airport landing slots and transportation services for children in need. In each case, Plott provided experimental proofs of concept and then, after deployment, demonstrated that these allocation systems both increased efficiency and improved welfare.

His research has produced some of the most fundamental discoveries in the behavioral foundations of economics and political science, including principles governing the stability of multiple market systems and voting processes. Plott was the first person to conduct experiments in which people

from around the globe participated in a single market, and his political science investigations tested predictions of formal theories related to the effect of agendas and voting procedures on committee decision-making using controlled laboratory experimentation.

Plott's work in testing theories has translated to real-world applications for resource allocation in complex markets, including markets for pollution permits in Southern California, auctions for electric power in California, access to natural gas pipelines, the combinatorial sale of fleets of vehicles, and more.

"Charlie has had major impacts on several fields within economics and politics. The key to his success is that he is both scientist and engineer: he attacks the fundamentals and develops new theories and paradigms while at the same time creating applications that solve real problems," said Jean-Laurent Rosenthal, the Rea A. and Lela G. Axline Professor of Business Economics and director of The Ronald and Maxine Linde Institute of Economic and Management Sciences, in a 2019 *Caltech News* story celebrating Plott's five-decade career. "He does not just dream up policies. He subjects them to rigorous experimentation in his laboratory. It's a hard furrow to plow, but a half-century in, it has been an extremely bountiful one."

Developing Powerful Incentives

It was the work of Plott, among others, that sparked an interest in Caltech for **John O. Ledyard**, the Allen and Lenabelle Davis Professor of Economics and Social Sciences, Emeritus, who first came to the Institute as a Fairchild Scholar in the late 1970s.

“That visit gave me an opportunity to see the glimmers of the beginnings of Charlie’s experimental work,” Ledyard recalled, noting that the processes reminded him, metaphorically, of engineering tools. “I saw Charlie’s lab, and thought it looked a little bit like a towing tank—which is used to test boat designs—where I could test my theories and also create new, viable market and organizational designs to solve problems.”

Ledyard joined the faculty in 1985, and while his research centered on the theoretical foundations of game theory and mechanism design—that is, how incentives and information influence organizations, markets, and political systems—he began to dabble in applied work, often with Plott.

“Having the tools that Charlie designed meant that I was not stuck arguing for changes in policies just on the basis of economics and political science theories,” Ledyard said. “I could actually demonstrate in a lab with human subjects that what I was saying had merit.”

One of the first projects Ledyard got called to work on was related to allocating space for instruments on JPL’s Cassini mission to Saturn.

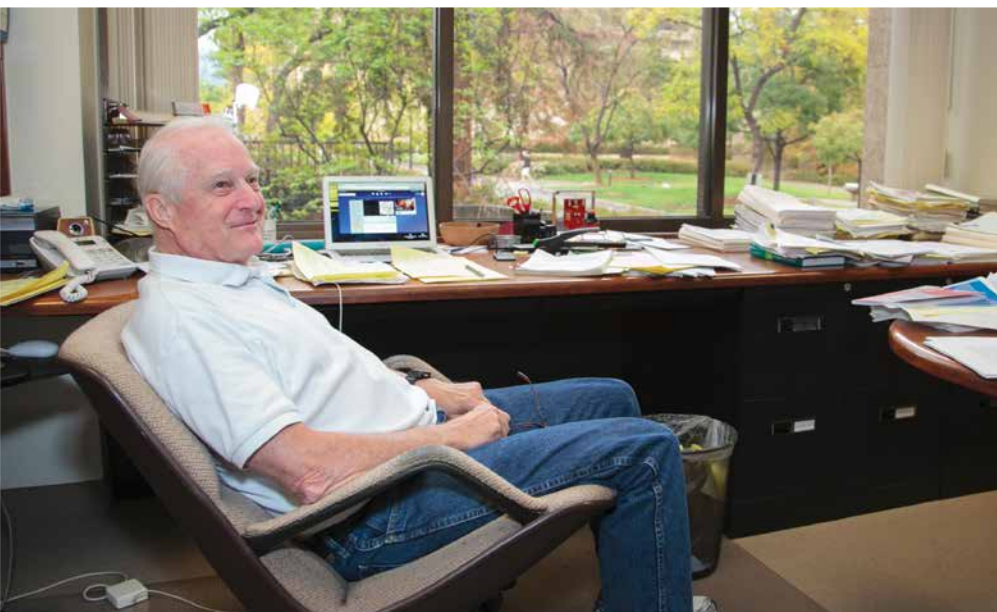
“We suggested for the Cassini project that each instrument developer be given a maximum amount of mass, power, et cetera, that they could expect to use on the spacecraft,” Ledyard explained. “If you designed to the parameters, we would let you fly. The proposal followed obvious economic principles applied to the ‘commons dilemma’ that the Cassini project faced. It was sold to skeptics by demonstrations using the lab. The project came in under budget, and every instrument flew successfully.”

He went on to apply similar experiments to help solve allocation problems in many other industries, including combinatorial auctions for logistics management, fishery permits, bond markets, and environmental markets.

In the early 2000s, Ledyard and colleagues founded the Social and Information Sciences Laboratory (SISL) at Caltech to address the growing need for economists and computer scientists to share information and collaborate on solutions for computer-based economic problems in areas as varied as power grids, kidney donor waiting lists, and online privacy. Now called the Center for Social Information Sciences (CSIS) and housed within The Ronald and

Maxine Linde Institute of Economic and Management Sciences, it’s a place where an interdisciplinary group of researchers is studying how markets and other social systems function in an increasingly complex, technology-driven world.

“I’ll be blunt: when I was division chair [from 1992 to 2002], I resisted pressures to create policy centers, instead favoring basic, foundational research,” Ledyard admitted. “But things change. The key is getting a small group of the faculty to collaborate across disciplines, and that’s what Caltech is really good at. That’s my hope for the CSSPP, too. I think it’s a great idea with a lot of possibilities.”



Tackling Corruption

Like Plott and Ledyard, **Jean Ensminger**, the Edie and Lew Wasserman Professor of Social Sciences, has done research in market economies, but hers has been from a very different point of view. Ensminger is an economic anthropologist whose research sits at the interface of anthropology, economics, political science, and development. She has conducted four decades of research in one African society, the Orma people of Kenya, and her early work traced the origins of a market economy from the field.

“I was interested in understanding, as things changed, what the relationship was between political systems and institutions and the level of economic performance,” Ensminger said. “I wanted to know what made the Orma economy tick, and why it wasn’t doing better than other parts of Kenya.”

When the World Bank, an international money-lending organization charged with reducing poverty, brought a goat-restocking project to her Kenyan research area in 2004, Ensminger began to hear stories of corruption from the locals. She started to investigate and eventually uncovered a complex web of fraud, theft, and even violence.

“I was really off in the wilderness on this World Bank project, and it would not have been easy to get funded by traditional means because it was so exploratory,” she said. “There really was no precedent for what I was trying to do. Consequently, the resources that I had in my Caltech research account were absolutely central to getting this project off the ground.”

Her work caught the attention of the World Bank and eventually the U.S. government, which asked Ensminger to testify before the House Financial Services Committee Subcommittee on International Monetary Policy and Trade in 2017.

She says the experience validated the idea that watchdogs and outside experts are needed to help inform policy. “We need academic specialists, journalists, and others with a great deal of knowledge in specific sectors to be watching over these organizations and government at all times,” Ensminger said.



Since she first encountered corruption in World Bank projects, she’s done work to compare more successful development projects with those that failed.

“In the end, it was easy to pick apart exactly what the policies were that made a big difference and provide that information to the World Bank,” she said. “There are people who run things on the ground who absolutely want to do a better job. I will never know how many I was able to reach, but I’ve been led to believe that it got quite a bit of traction.” Today, Ensminger continues to investigate corruption in World Bank projects by developing new statistical tests to uncover strategic data manipulation in expenditure reports.

“The notion in our division has been that economists and political scientists will often naturally gravitate to policy work later in their careers,” she said. “And I sort of followed that pattern. There’s more openness to policy research than there was when I arrived, and I think that’s good. The fact that CSSPP exists is testament to the fact that things are changing.”

Looking to the Future

Hannah Druckenmiller, assistant professor of economics and a William H. Hurt Scholar, represents change, too, as the first environmental economist to be hired at Caltech.

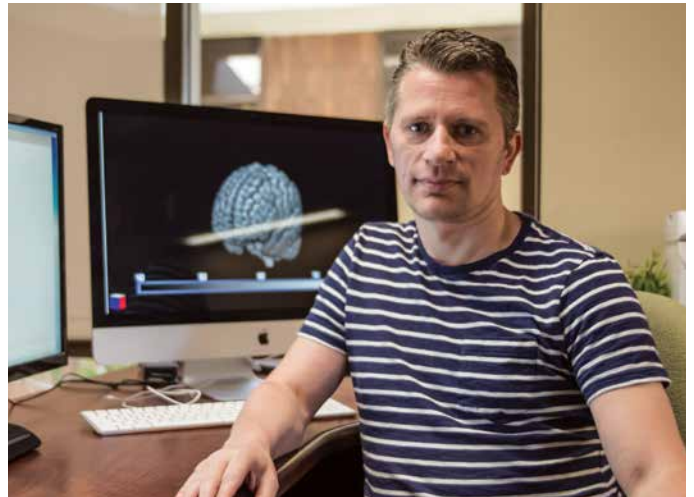
“I spent years looking for an environmental economist, and they seem to have found somebody who’s going to fit in,” said Ledyard. “This is a good sign for policy.”

Druckenmiller’s research focus is on natural lands and the value that ecosystems like forests and wetlands provide to society: “I try and understand the cost and benefits of natural resource production. And within that, I focus on developing new tools and data that can help to put the benefits on the same footing as cost so that people can make decisions about when they think resource protection is worth it and when it’s not.”

To move the needle, though, Druckenmiller believes that it’s up to academia to both generate a strong evidence base for policy recommendations and relay those research findings to policymakers.

“That engagement piece is what’s really been missing historically at universities,” she said. “You see your job as producing the research and teaching, but teaching the policymaker is something that we need to focus more on, along with being able to communicate research transparently to inform decision-making.”

Recognizing CSSPP’s potential to bridge the gap between the first-rate science being done at Caltech and decision-makers, Druckenmiller noted: “I think the center is all about recognizing and facilitating that bridge, and that’s something I want to be a part of.”



Dean Mobbs, professor of cognitive neuroscience and the Allen V. C. Davis and Lenabelle Davis Leadership Chair and director of the Caltech Brain Imaging Center, has just started to explore the potential policy implications of his work. Much of his research focuses on fear and anxiety, which he is now beginning to look at in the context of social media.

“Social media creates this cycle of a type of interaction that we don’t normally have in the real world,” said Mobbs, who is leading a new project that uses social psychology and neuroscience to explore the relationship between social media use and mental health. “We’ve developed experiments where we’re looking at positive and negative interactions online and recording brain activity while people are communicating using MRI-compatible keyboards.”

He and his lab members hope to elucidate the role that anxiety plays in the way that people engage with social media. Insights gleaned from the project may help inform health professionals who are designing interventions, as well as influence policy changes that could be adopted by social media companies to reduce harm.

“The gap between understanding how social media negatively affects people and how to build interventions to mitigate risk is actually quite close—it’s something that I can see, all the way from the basic science to the real-world applications,” said Mobbs. “There’s a clear path, and it’s the right time to do it, so I’m really excited.”

Where Are They **Now?**

AFTER EARNING THEIR PHDS IN 2023 . . .

Sumit Goel is a postdoctoral associate in the Division of Social Sciences at New York University Abu Dhabi.

Daniel Guth is a postdoctoral associate at the University of Rochester Medical Center.

Wade Hann-Caruthers is a postdoctoral fellow in game theory at the Technion – Israel Institute of Technology.

Jeffrey Zeidel is a postdoctoral associate with the Center for Behavioral Institutional Design at NYU Abu Dhabi.

AFTER COMPLETING THEIR POSTDOCTORAL APPOINTMENTS IN 2023 . . .

Caroline Charpentier is an assistant professor in the department of psychology and the Brain and Behavior Institute at the University of Maryland.

John Vincent (J. V.) Decemvirale is an assistant professor of art history and global cultures at Cal State San Bernardino.

Margaret Gaida returned to HSS for the 2023–2024 academic year as a lecturer.

Lisa Marieke Kluen is a staff scientist at Harvard Medical School (McLean Hospital).

Charles Kollmer joined the history faculty at Flintridge Preparatory School.

Hannah LeBlanc is a social studies teacher at the Francis Parker School.

Adam Pham joined the research department at Channel Precision as a data/ML scientist.

Fedor Sandomirskiy is an associate research scholar and lecturer in the department of economics at Princeton University.

Sarah Tashjian is a lecturer in psychology (assistant professor) at the University of Melbourne.

Qing (Robin) Zhao is a cost engineer at the Jet Propulsion Laboratory.

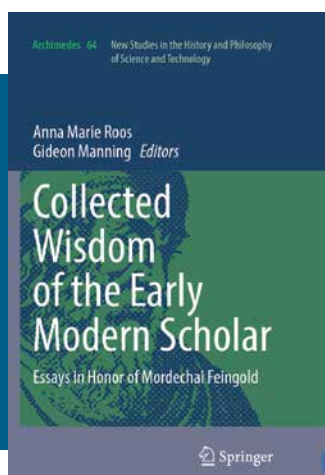
Honors & Congratulations

The Society for the Advancement of Economic Theory elected **Marina Agranov**, professor of economics, as an Economic Theory Fellow.



The Institute appointed **Jennifer Jahner**, professor of English, as the dean of undergraduate students, effective May 15, 2023.

In addition, the Huntington Library named Jahner the Fletcher Jones Distinguished Fellow in British History and Culture for the 2023–2024 academic year.



To celebrate the career and legacy of **Mordechai Feingold**, the Kate Van Nuys Page Professor of the History of Science and the Humanities, leading scholars in the history of science, the history of universities, intellectual history, and the history of the Royal Society came together to pen *Collected Wisdom of the Early Modern Scholar: Essays in Honor of Mordechai Feingold* (Springer, 2023). According to the publisher's website, "Modeling the interdisciplinary approaches championed by Feingold as well as the essential role of archival studies, the volume attests to the enduring value of his scholarship and sets a benchmark for future work in the history of science and its allied fields."

Assistant Professor of Economics and William H. Hurt Scholar **Kirby Nielsen** and her co-author John Rehbeck (Ohio State University) received the 12th Exeter Prize for their paper "When Choices Are Mistakes," which appeared in the *American Economic Review* (July 2022). The annual prize is awarded to the most outstanding article published in a refereed journal in the previous calendar year from the fields of experimental economics, decision theory, and behavioral economics.

Assistant Professor of Computing and Mathematical Sciences and Economics **Eric Mazumdar** received an NSF CAREER Award for his proposal titled "Learning for Strategic Interactions in Societal-Scale Cyber-Physical Systems."

In March, Caltech awarded tenure to **Chip Sebens**, who joined the HSS faculty in 2018. He is now a professor of philosophy.

The Associated Students of the California Institute of Technology (ASCIT) included Lecturer in Japanese **Ritsuko Hirai Toner** among its teaching award honorees for the 2022–2023 academic year. Since the mid-1970s, the undergraduates have bestowed this award upon professors, instructors, and TAs who demonstrate an exceptional commitment to teaching and concern for their students' learning.

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

The division awarded internal fellowships to the following HSS graduate students during Caltech's 2022–2023 academic year:

- **Sumit Goel** (Roger and Marjorie Davisson Graduate Fellow)
- **Po-Hsuan Lin** (James and Karen Gerard Fellow in Social Sciences)
- **Lindsey Gailmard** (Lance E. Davis Graduate Fellow)
- **Marcos Nazareth-Gallo** (A. Michael and Ruth C. Lipper Graduate Fellow)
- **Jeff Zeidel** (Repetto-Figueroa Family Graduate Fellow)
- **Daniel Guth** (Stephen A. Ross Memorial Fellow)



Four HSS staff members were celebrated for the important work they do to advance the mission of the Institute at the 68th annual Staff Service and Impact Awards on June 8. The honorees included:

- **Laurel Auchampaugh** (35 years), Division Option Manager, HSS Undergraduate Options and Social Sciences Graduate Programs
- **Nareen Manoukian** (10 years), Lecturer in Writing, Writing Specialist
- **Mary Martin** (20 years), Administrative Assistant
- **Kapaūhi Stibbard** (10 years), AV & Logistics Coordinator



On the occasion of Caltech's 129th commencement exercises, the Division of the Humanities and Social Sciences was pleased to present five outstanding PhD recipients (listed with their dissertations):

- **Sumit Goel** ("Essays in Mechanism Design and Contest Theory")
- **Daniel Guth** ("Essays in Health Economics")
- **Wade Hann-Caruthers** ("Essays on Social Learning and Social Choice")
- **Claudia Kann** ("Computational Methods in the Study of Political Behavior")
- **Jeffrey Zeidel** ("Essays in Behavioral Economics")

At its holiday gathering on December 7, HSS presented its Brass Division Awards to recognize the outstanding service and teaching of the following honorees:

- **Victoria Cruz**, Staff and Facilities Manager
- **Letty Diaz**, Administrative Assistant
- **Peter McAniff**, Lecturer in Economics
- **Steve Quartz**, Professor of Philosophy

The HSS student prize winners honored at Caltech's commencement on June 16 included:

- **Darleine Abellard** (Mary A. Earl McKinney Prize in Prose Fiction)
- **Mohammed Said L. Alhalimi** (Eleanor Searle Prize in Law, Politics, and Institutions)
- **Katherine Chang** (David M. Grether Prize in Social Science)
- **Reggy M. Granovski** (Rodman W. Paul History Prize)
- **Shwetha Kunnam** (Gordon McClure Memorial Communications Prize in English)
- **Grace Liu** (Hallett Smith Prize)
- **Aramis Mendoza** (Gordon McClure Memorial Communications Prize in History)
- **Lark Mendoza** (Gordon McClure Memorial Communications Prize in Philosophy)
- **Margaret (Maggie) Sui** (Mary A. Earl McKinney Prize in Poetry)
- **Vansh Tibrewal** (Alexander P. and Adelaide F. Hixon Prize for Writing)
- **Zhenlin Kang** (John O. Ledyard Prize for Graduate Research in Social Science)

Support for HSS Research

2023 HIGHLIGHTS INCLUDE:

Xiaolei Zhu (BS '90) and Jun Teng (BS '92) made another generous investment in HSS, this time by endowing a visiting professorship in financial economics to enhance Business, Economics, and Management teaching and research. Their past gifts included significant support for the Hixon Writing Center.

A group of donors established the Roger Noll Fund to honor economist **Roger Noll**, who served as chair of HSS from 1978 to 1982 and was essential to the formation of the social sciences graduate program. The fund will provide discretionary resources to recruit and support first-rate scholars.

The National Endowment for the Humanities awarded a grant to **Diana Kormos-Buchwald**, the Robert M. Abbey Professor of History and director and general editor of the Einstein Papers Project (EPP), to support the preparation of volumes 17 to 19 of the writings, lectures, and letters of Albert Einstein, which cover the period from 1930 to 1933, including Einstein's three visits to Caltech.

The Simons Foundation awarded its Shenoy Undergraduate Research Fellowship in Neuroscience (SURFIN) for two undergraduates to work with **Qianying Wu** (social and decision neuroscience graduate student), **Na Yeon Kim** (postdoctoral scholar research associate in neuroscience), and **Ralph Adolphs** (Bren Professor of Psychology, Neuroscience, and Biology) on "Model-Based Analysis of Pupil Responses to Naturalistic Videos in Autism."

Kudos to the HSS graduate students who recently secured external support for their research, including:

- **Matthew Estes** for "Roadblocks to Justice: Estimating the Effect of Travel on Evictions" from the John Randolph Haynes and Dora Haynes Foundation
- **Po-Hsuan Lin** for "Doctoral Dissertation Research in Economics: Two Experiments on the Behavioral Equivalence of Dirty Faces Games" from the National Science Foundation
- **Aldo Lucia** for "Doctoral Dissertation Research in Economics: Expected Utility Core of Risk Preferences" from the National Science Foundation

The National Institutes of Health continued to support HSS neuroscience research through awards to:

- **Ralph Adolphs**, for "Using Complex Video Stimuli to Elucidate Atypical Brain Functioning in ASD" and (with EAS's Pietro Perona) "Computational Analysis of Body Movements in People and Animals"
- **Dean Mobbs**, for "Fractionating Human Defensive Circuits Across Changing Levels of Threat Imminence" and "Processes and Circuitry Underlying Threat Sensitivity as a Treatment Target for Comorbid Anxiety and Depression"
- **John O'Doherty**, for "Probing the Neural Computations Underlying Goal-Directed Decision-Making in Humans with Single-Neuron Recordings"
- **Antonio Rangel**, for "Mechanisms of Multi-Attribute Decision-Making"



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DIVISION OF
THE HUMANITIES AND SOCIAL SCIENCES

Editor in Chief: Candace A. Younger

Writer: Katie Neith

Managing Editor: Hanna L. Ramsey

Designer: Bacio Design & Marketing, Inc.

(Most) Photography: Van Urfalian, Lance Hayashida

CALTECH
DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES
MC 228-77 PASADENA, CALIFORNIA 91125
HSS@CALTECH.EDU