

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

2020 IN REVIEW

Caltech





GREETINGS FROM THE CHAIR

While an end-of-year message is expected to be benignly positive, milquetoast will not do for 2020. The enduring trauma of the COVID-19 pandemic, the challenges to our international students and colleagues, reactions to the global protests against racial bias, and the state of our nation's politics made 2020 one of the most unsettling in the division's history. We have been forced to face these crises physically separated from one another for most of this year.

We endure because of the contributions of our citizens. I want to thank those who helped a colleague, a friend, or a stranger in need. As Chair, it is my privilege to know about many such acts that remain unacknowledged. As a division, we have faced the difficulties of 2020 through a combination of ingenuity, doggedness, and civility that serves us well going forward. The perseverance of so many enables us to present a Year in Review that is as robust as ever, notwithstanding the year's many challenges. My gratitude runs as deep as my admiration.

As we turn toward 2021, allow me to share the metaphor that has guided me these last years: that of HSS as a garden. The garden is ubiquitous in human experience; it is found across nearly all climatic ranges, and some do not even involve plants. A garden's size constraints force us to choose what flowers and what bears fruit. A well-tended garden is diverse and harmonious. It welcomes plants from distant shores and attends to the local climate and history. This year has demonstrated that HSS can and must be a community garden. Next year, 2021, will inevitably be another interesting one. I look forward to our new discoveries and to seeing our garden evolve with our community.

This edition of the Year in Review, like its predecessors, allows you to take a tour of HSS. In it, you will see the span of our research and a salutation to the breadth of our teaching—which is all the more remarkable given that the number of faculty in HSS is smaller than that of many academic departments elsewhere. Enjoy!

JEAN-LAURENT ROSENTHAL

Rea A. and Lela G. Axline Professor of Business Economics;
Ronald and Maxine Linde Leadership Chair, Division of the Humanities and Social Sciences

2020 IN REVIEW

We have always featured stories in the HSS Year in Review in chronological order. This year, in keeping with the unprecedented nature of 2020, we are trying something new, with stories organized along thematic lines.

NEW FACES, NEW COURSES, NEW WAYS OF TEACHING



New Faculty Interview: Kirby Nielsen

Assistant professor of economics **Kirby Nielsen** studied pre-medicine biology in college before realizing her true passion lay in research and economics and, ultimately, the field of experimental economics. Her work focuses on individuals' decision-making, and she uses experimental methods to answer economic questions. One of her current research projects studies how individuals seek out information for uncertain events. "We are comparing when people like to receive information about something that's already happened in the past, such as a medical test, versus learning about something that's resolving over time, such as an election," Nielsen explained to *Caltech News*. "What we find is that people are more likely to avoid information in the latter case, where a situation is not resolved. It's the rollercoaster of emotions that people don't seem to like." Prior to joining HSS over the summer, Nielsen received her PhD in economics from Ohio State University in 2018 and spent two years as a postdoctoral fellow in economics at Stanford University.

The summer also saw the arrival of Professor of Visual Culture **Brian Jacobson** and Professor of Economics **Charles Sprenger**. Jacobson is a historian of media, art, and technology who came to HSS from the University of Toronto. Sprenger studies behavioral and experimental economics, and he came from UC San Diego's Rady School of Management. We look forward to sharing more about their research next year. In the meantime, you can learn about them and other new arrivals to HSS in our 2020 New Faces video.



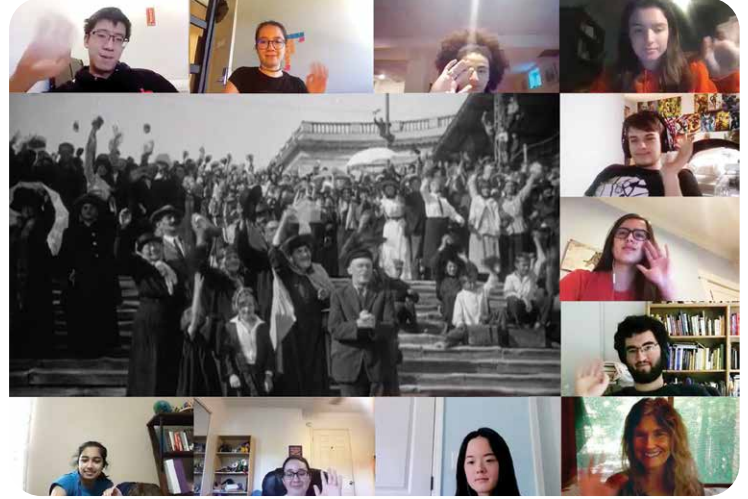
Shining a Light on African American History

In May, *Caltech News* and *Caltech* magazine profiled **Danielle Wiggins**, who joined HSS as an assistant professor of history in the summer of 2019 after spending a year as a visiting fellow at the University of Virginia's Jefferson Scholars Foundation. Wiggins earned a PhD in history from Emory University, where she studied African American political history and urban political economy. While her research initially focused on Black Republicans in Atlanta in the 1970s and '80s, she shifted to examine Black political leaders as Democrats, where less research had been done in the past. She found surprising similarities between members of the two parties, particularly in the post-civil rights era. "Both were rather punitive in ways that were unexpected for me. I expected Black Democrats at least to be more interested in rehabilitation, in getting at the causes of crime," Wiggins explained. "I started thinking about the ways in which Black political officials participated in fostering and sustaining the mass criminalization of poor people of color and how they were involved in the expansion of mass incarceration." For her current book project, Wiggins examines three interconnected crises of the postindustrial city: the crisis of crime, the crisis of the Black family, and the crisis of joblessness and unemployment.



Students Learn About Ethics and AI in Criminal Justice

Frederick Eberhardt, professor of philosophy, taught Ethics & AI during the 2020 winter term. He developed the case-study-based course for students to explore the challenges at the interface of algorithms and human values. Eberhardt had his class read the famous ProPublica study on the COMPAS algorithm, which revealed that a software program used across the country to predict future criminal activity was biased against Black people, and he guided his students through a discussion on “machine bias” in algorithms used in parole determinations. The course featured guest speakers, including engineer Julia Dressel from the Bay Area startup Recidiviz, a nonprofit technology company that aims to help the criminal justice system end mass incarceration. Attorney Lyric Kaplan spoke to the students about her work advising clients on an array of privacy, cybersecurity, and technology matters. The speakers gave students a real-world perspective on how issues in ethics and artificial intelligence play out in the criminal justice system and other contexts.



Teaching Film in the Time of Zoom

In her Introduction to Film class, Professor of English **Catherine Jurca** guides her students in film analysis and interpretation from the era of silent movies through that of classical Hollywood; they then explore French New Wave and other genres, including Westerns, before concluding with a present-day superhero movie. When Caltech cut over to remote learning in March, Jurca thought it would be relatively easy to transition the course to the computer screen, but she found the loss of in-person group viewing more disruptive than she expected. She determined that it worked best to distribute a PowerPoint presentation with links to the movie clips in advance and have the students switch between sitting in the Zoom virtual classroom, watching the clips on their own, and coming back together for a discussion. “I have to make sure that what I want them to get from the clip is something that they can see just by playing it through on their own,” she said to *Caltech News*. “Since I can’t stop and start [the film clips] and interject, I need to make the significance more immediately apparent.” Jurca found new ways to foster a sense of connection with the students, including one-on-one virtual meetings and a friendly wave at the beginning and end of each class.

Postdoctoral Instructor Hori Ponders, “What Is Motherhood?”

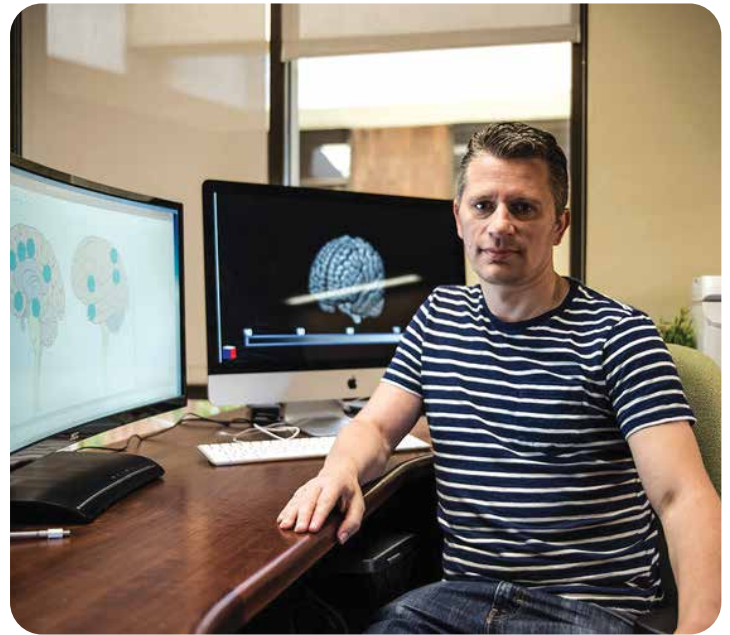
Fletcher Jones Foundation Postdoctoral Instructor in Contemporary Literature **Julia Hori** challenged her students to look beyond the biological relationship between mother and child in her fall 2020 course Literary Constructions of Motherhood. Hori, who joined HSS this summer, focuses much of her research on empire and slavery and how those institutions manifest in the present. “Thinking about my background in colonialism has led me to think long and hard about the meaning of ‘mother country,’” she explained in an interview with *Caltech News*. “I started thinking about these other maternal frameworks through which the world is built and imagined.” The term “mother” crops up across our language and culture, from “Mother Earth” to “mother tongue” to “motherland.” Hori offered her students different ways to think through narratives of mothering and motherhood as shaped by a wide range of social, political, historical, and material contexts.



RESEARCH DURING A PANDEMIC

An Invisible Threat

The COVID-19 pandemic presented a new way for Professor of Cognitive Neuroscience and Chen Scholar **Dean Mobbs** to study how people respond to danger—in this case, the threat of an unseen virus. In an interview with *Caltech News*, Mobbs explained that the novel coronavirus has put humans' anxiety-producing brain circuits into overdrive. The abstract threat caused a desire to seek out information wherever it was available, but that often leads to information overload and makes people more anxious. "Our brains preferentially attend to negative stories because they allow us to learn about those threats without actually encountering them," Mobbs said. "But when we're getting so much negative information, it becomes overwhelming." So, even though avoiding threats and protecting oneself is an adaptive strategy, Mobbs recommended practicing mindfulness and seeking information from reliable sources to ease the stress. NBC Los Angeles interviewed Mobbs in April about fear, anxiety, and the impact of a 24-hour news cycle and around-the-clock reports on the COVID-19 pandemic.



As the Pandemic Progressed, People's Perceived Risks Went Up

Another study from the Mobbs lab revealed that, in the first week of the pandemic, people living in the United States generally underestimated their chances of catching the virus or getting seriously ill, demonstrating "optimism bias." As the days progressed, people became more worried about their personal risk and began increasing protective behaviors like hand washing and social distancing. "A little bit of anxiety is good in this case," explained **Toby Wise**, a postdoctoral scholar in the Mobbs lab and lead author of the study. "It means that people will be more prudent. We found that an individual's assessment of personal risk affected their behavior more than concerns about the safety of other people. Knowing this helps in the development of public health strategies." Other co-authors on the study, which was published in the journal *Royal Society Open Science* and mentioned in *Forbes* magazine, include postdoctoral scholar **Tomislav Zbozinek** and Research Assistant Professor of Neuroscience **Cindy Hagan**.



Forming New Habits

In the spring, **Colin Camerer**, the Robert Kirby Professor of Behavioral Economics and the T&C Chen Center for Social and Decision Neuroscience Leadership Chair in the Tianqiao and Chrissy Chen Institute for Neuroscience, started examining the habits people were forming in response to the pandemic. He predicts that this coronavirus's ripple effects will lead to long-lasting behavioral changes in the arenas of public health, education, and more. One example of this "forced experiment," as Camerer called it, is how universities, including Caltech, swiftly transitioned to online learning, and researchers are finding that many students prefer the new methods of instruction. "Students can watch lectures online whenever they want, and when they're most attentive and not sleepy or stressed, and they can press rewind," Camerer explained to *Caltech News*. "I think that going forward a lot of professors will adopt a 'flipped' classroom model, where they will make videos for their lectures and use the classroom for discussion." Camerer and his lab members continue to explore which habits formed during the pandemic will persist in the physical classroom and beyond.



Will the Pandemic Influence Our Emotions, Attitudes, and Biases?

Amid months of stay-at-home orders precluding in-person human experiments on campus, **Ralph Adolphs** (PhD '93), the Bren Professor of Psychology, Neuroscience, and Biology and the Allen V. C. Davis and Lenabelle Davis Leadership Chair and Director of the Caltech Brain Imaging Center, teamed up with colleagues to craft a long-term internet-based study that examines how the COVID-19 pandemic has influenced people's emotions, attitudes, and biases. He and collaborators designed the COVID-Dynamic Longitudinal Study to take weekly surveys of approximately 1,000 people from all 50 states, with questions about their experiences related to COVID-19, adherence to public health recommendations, and trust in political and scientific leaders. The researchers also posed questions about various psychological factors, such as personality, mood, and coping behaviors. "Given a huge and persistent stressor like the COVID pandemic, how much can we expect people to actually change?" Adolphs asked. "In a sense, this is allowing us to map out which parts of a person can change and what parts stay fairly immutable no matter how much the environment changes." He hopes that the trove of data collected over the course of the year will be useful to social scientists and those designing public health policy in the future.

What History Has Taught Us About Epidemics

Rea A. and Lela G. Axline Professor of Business Economics and Ronald and Maxine Linde Leadership Chair of the Division of the Humanities and Social Sciences **Jean-Laurent Rosenthal** (PhD '88) has studied the economic impacts of the Parisian cholera epidemic of the 1830s, which killed approximately 20,000 people in just one month. In an interview with *Caltech News*, Rosenthal noted several common themes between that outbreak and the 2020 coronavirus pandemic—most notably that lower-income people were more affected. As many of the wealthy fled the city for the safety of their country homes (this was observed in places like New York City this year as well), poorer people remained, often with no choice but to keep working at their jobs in the city. Rosenthal explained that one difference between the outbreaks is their respective death rates. "The 1832 spike in death rates in Paris is simply unmatched anywhere in this current pandemic. Entering a hospital at a time of cholera and surviving—well, that was a feat," said Rosenthal. "The difference between COVID-19 and all these past episodes is that we know more about diseases, and we have the ambition and ability to save as many people as possible."

ELECTION 2020

Hidden Donors Play Significant Role in Political Campaigns

Caltech social scientists found that people who contribute less than a total of \$200 to a political campaign, sometimes referred to as “hidden donors,” can make up a sizable portion of a candidate’s campaign funds. Professor of Political and Computational Social Science **Michael Alvarez**, Kay Sugahara Professor of Social Sciences and Statistics **Jonathan N. Katz**, and alumna **Seo-young Silvia Kim** (PhD ’20) worked together on the report, which was published in *Election Law Journal* in March. Their study looked at the 2016 presidential campaign of Bernie Sanders, which, unlike many other campaigns at the time, used an intermediary online fundraising service that required all contributions to be reported to the Federal Election Commission. (Typically, donations from a single donor that add up to \$200 or less do not need to be reported.) The researchers analyzed more than 100 million donation records and found that the smaller contributions made up a total of 33 percent of all funds, and that there were seven times more hidden donors than visible ones. Alvarez summed it up: “What this is saying is that grassroots efforts to raise money from tens of thousands of people are an important part of a politician’s campaign.”

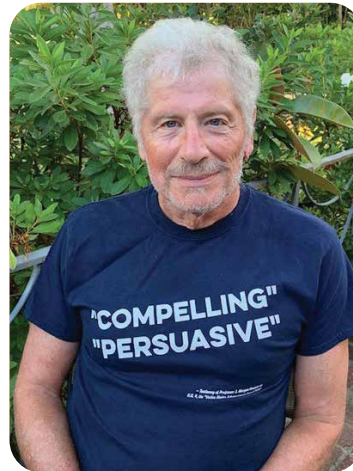


Over the summer, the Caltech Library digitized **J. Morgan Kousser**’s 1974 book *The Shaping of Southern Politics: Suffrage Restriction and the Establishment of the One-Party South, 1880-1910* and shared it on the open-access repository CaltechAUTHORS. Since then, the e-book has been downloaded over 230 times.

Super Tuesday in California

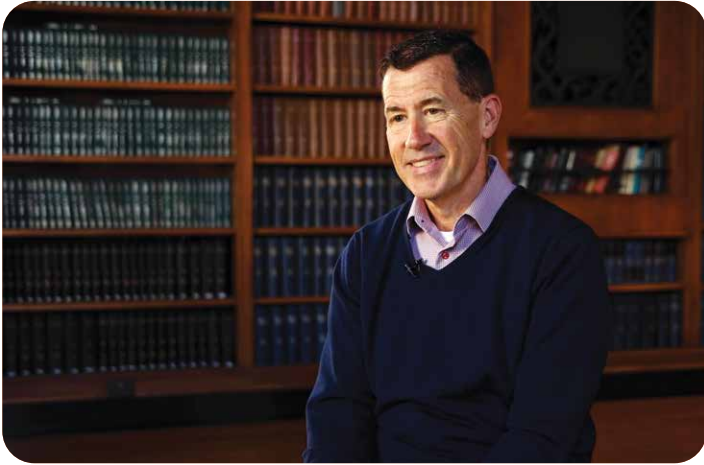
For the March 3 primary election, voters in Los Angeles and Orange Counties encountered new voting machines and processes. Working with colleagues and students, **Michael Alvarez**, who also serves as co-director of the Caltech/MIT Voting Technology Project, collected and analyzed data to study how these changes affected the voting experience and election integrity. He cautioned voters to be patient and double-check their ballots before submitting. Alvarez also correctly anticipated that voters would not see election results quickly (he echoed this sentiment in a *Washington Post* article and also analyzed live election results on KPCC).

A Long March Toward Progress



Professor of History and Social Science, Emeritus, **J. Morgan Kousser** retired this June after 51 years as an HSS faculty member. He spent his career fighting racial discrimination and studying voter rights and voter suppression, and he’s not done yet. Kousser shared in an interview with *Caltech News* that the decision to stop teaching was tough, but he felt compelled to

spend more time writing about the history of voting rights and school segregation and continuing to participate in the struggle for racial equality. He has already written two books and many scholarly papers on laws that fostered racial discrimination as well as laws intended to combat it, and he has served as an expert witness in numerous court cases on voter ID laws and the disfranchisement of former prisoners. In October 2019, he testified before a House Judiciary Subcommittee on a bill to restore key provisions of the Voting Rights Act of 1965 that were struck down by the United States Supreme Court in 2013. A subcommittee report called his testimony “compelling” and “persuasive.” While HSS originally had planned to celebrate Kousser’s research and legacy in May, the conference and celebration have been postponed due to the pandemic.



Safe and Secure Presidential Elections

Michael Alvarez gave the first-ever virtual Earnest C. Watson Lecture on October 7, titled “In the midst of a global pandemic, how can we ensure a safe and secure presidential election?” In his lecture, Alvarez explored common misconceptions about the 2020 presidential election. He explained the data-science methods and tools his research team uses to improve the security of election infrastructure, and to provide rapid monitoring and auditing of the integrity of elections. Alvarez also shared ways in which scientific detection of election problems helps election officials improve their procedures and technologies, giving voters the information they need to feel confident in the integrity of this and future elections. The recorded lecture was posted on Caltech’s YouTube channel.

In Caltech’s *Exchange of Ideas* publication over the summer, Alvarez commented on how the COVID-19 pandemic might affect voting processes and technologies, and he emphasized how important it is for the voter registration database to be as accurate as possible. He also addressed the significant challenges faced by states in preparing for the fall’s presidential election.

The Election Experts

In interviews for the fall issue of *Caltech* magazine, HSS faculty shared their perspectives on a range of critical topics in the run-up to the November 3 presidential election.

- “One of the things we’ve come to appreciate in our research with the Caltech/MIT Voting Technology Project is just how much goes on behind the scenes to get people registered to vote; to verify and record their registration information; and then to provide voters the opportunity to securely, and in an accessible and simple manner, cast their ballots.”
— **Michael Alvarez**
- “[A] problem in forecasting presidential elections is that a poll represents a snapshot of public opinion today, but what we really care about is what happens on the first Tuesday after the first Monday in November. Things change quickly, even in a relatively brief space of time, and, clearly, the farther out we are from Election Day, the more uncertainty we have to accept.” — **Jonathan N. Katz**
- “Writing expert witness reports and testifying in cases are exactly like what I have always done as a scholar. I have looked at the racially discriminatory effects of laws; I have looked at the racially discriminatory intent of laws. I have examined them by looking at a lot of evidence. I write very long papers for these cases. They are scholarly publications, and whether they relate to something that happened 100 years ago or something that happened five years ago or yesterday doesn’t really, in principle, seem to make any difference.” — **J. Morgan Kousser**
- “People often feel demoralized when the national election doesn’t go their way, but I think they can feel more empowered and more like they live in a democracy when they are invested in state and local politics . . . Many federal policies began at the state and local level, where you can get a sense of the larger implications of a policy by seeing how it functions at a smaller scale.” — **Danielle Wiggins**



MORE VISUAL CULTURE

The Caltech-Huntington Program in Visual Culture Continues for Its Second Year



Artist, designer, and writer **Jessica Helfand** joined HSS as the Winter 2020 artist-in-residence in the Caltech-Huntington Program in Visual Culture, which was established in 2018 with a grant from The Andrew J. Mellon Foundation. Helfand's passion for the intersection of art and science drew her to this opportunity. "My own studio practice has always been focused on the visualization of human biology, often exploring the line between abstraction and representation," she explained in an interview with *Caltech News*. While at Caltech, Helfand taught an undergraduate course, Studies in Visual Biography, in which students explored the archives at Caltech and The Huntington. She asked students to examine forms of personal documentation like journals, identity cards, and passports to consider the social history and visual methods implicit in the construction of material evidence. Helfand challenged her students to be "astute witnesses" while telling stories other than their own. At a public event in January, she presented her series of paintings, "The Cushing Portraits," and participated in a panel discussion with HSS neuroscientist **Ralph Adolphs**.

Visual Culture Event Recap

The early part of 2020 featured a robust slate of visual culture events, before the pandemic forced the cancellation of much of the remainder of the year's programming:

- In January, historian and theorist of the face and body Sharrona Hyla Pearl presented "Super Recognizers to the Rescue," in which she discussed some people's ability to remember every face they've ever encountered.
- Eileen Reeves, professor of comparative literature at Princeton University, imagined an encounter between Galileo Galilei and Diego Velázquez in 1630 A.D. in her lecture "Borrowed Light: Art and Astronomy at the Villa Medici."
- In her talk "More Than Pretty Pictures," MIT research scientist and science photographer Felice Frankel discussed her approach to creating depictions in science and engineering and considered how far one can go when "enhancing" science images.
- Eli and Edythe Broad Professor of History and Literature, Emeritus, **John Brewer**'s lecture, titled "The Volcano, the Buried Cities, and the Sublime: Vesuvius in the Age of Revolutions," described changing views of the history and aesthetics of the Mount Vesuvius eruption of 79 C.E.
- Sven Dupré, professor of history, art, science, and technology at Utrecht University, illustrated the role of performative methods in the study of the arts and material culture in his talk "The Reconstruction of Colour Worlds."



Caltech-Huntington Program in Visual Culture



"Ferrofluid" by F. Frankel

More recently, there is a visual culture component to the new seminar series *Critical Intersections: Conversations on History, Race, and Science*, which, for its inaugural year of 2020–2021, is dedicated to the history of Caltech and Southern California leading up to and beyond eugenics. For each event, starting with "Sitting Down with Uncomfortable Things in the Caltech Archives" on October 2, the organizers have invited one or more artists to participate, and some have created unique artworks in relation to a seminar's given topic, which have been shared with members of the Caltech community.

REAL-LIFE APPLICATIONS



Making a Better Match

For many years, the Pasadena Unified School District's open-enrollment system has used a lottery for parents seeking to place their children in schools outside their neighborhood. Allen and Lenabelle Davis Professor of Economics **Federico Echenique**, Professor of Computing and Mathematical Sciences Adam Wierman, and former HSS faculty member Laura Doval (now at Columbia Business School) teamed up to improve the system, which has been criticized as both inefficient and prone to gaming by anxious parents. The researchers studied three years of PUSD data on families' participation and preferences, how families were assigned to schools, and whether they ended up registering in the district. They then proposed changes to the lottery's algorithm, including to allow families to sign up for the waiting list for every school they are interested in, and then tested their proposals against the previous year's data. With the team's improved algorithm, families are not only more likely to get their top match but are also more likely to keep their children in the school district rather than enrolling them in private or charter schools.

A Mingling of Computational and Economic Ideas

In the early 2000s, **John Ledyard**, the Allen and Lenabelle Davis Professor of Economics and Social Sciences, Emeritus, and others recognized the growing need for economists and computer scientists to share information and devise solutions for computer-based economic problems. That research continues today in the Center for Social Information Sciences (CSIS), which is funded by The Ronald and Maxine Linde Institute of Economic and Management Sciences and co-directed by Federico Echenique and Adam Wierman. CSIS enables an interdisciplinary network of professors, postdoctoral scholars, and students to perform cutting-edge research in the now-flourishing field of computational economics. "The center is doing exactly what we hoped for in the beginning: each group is better for being a part of the other," Ledyard told *Caltech News*. "Some of the greatest breakthroughs at Caltech and other places have come from the spaces between disciplines."



Training Algorithms to Spot Online Trolls

Professor of Political and Computational Social Science **Michael Alvarez** and Bren Professor of Computing and Mathematical Sciences Anima Anandkumar collaborated to develop a machine-learning algorithm that monitors online social media conversations as they evolve, which could one day lead to an effective and automated way to spot online trolling. Previously existing methods to cull social media data are either fully automated and not interpretable or rely on a static set of keywords, which can quickly become outdated. To discover new and relevant keywords, the Caltech team used a word-embedding model that represented words in a vector space where the “distance” between two words was a measure of their linguistic or semantic similarity. Then the model showed the extent to which certain keywords were related, providing context for how they were being used. The team, which also included alumnus **Nicholas Adams-Cohen** (PhD '19), presented this work at the AI for Social Good workshop at the Conference on Neural Information Processing Systems in Vancouver, Canada, late last year. Alvarez and Anandkumar spoke about the study, titled “Finding Social Media Trolls: Dynamic Keyword Selection Methods for Rapidly-Evolving Online Debates,” on KPCC’s *AirTalk* in January.

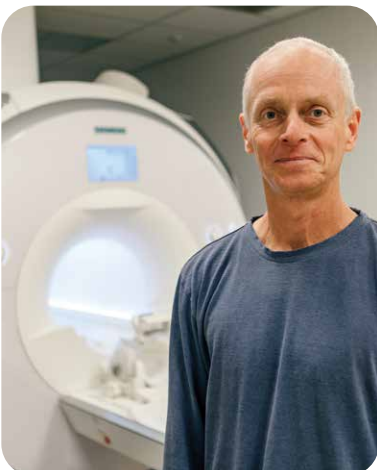


Economists Suggest Going with the Average

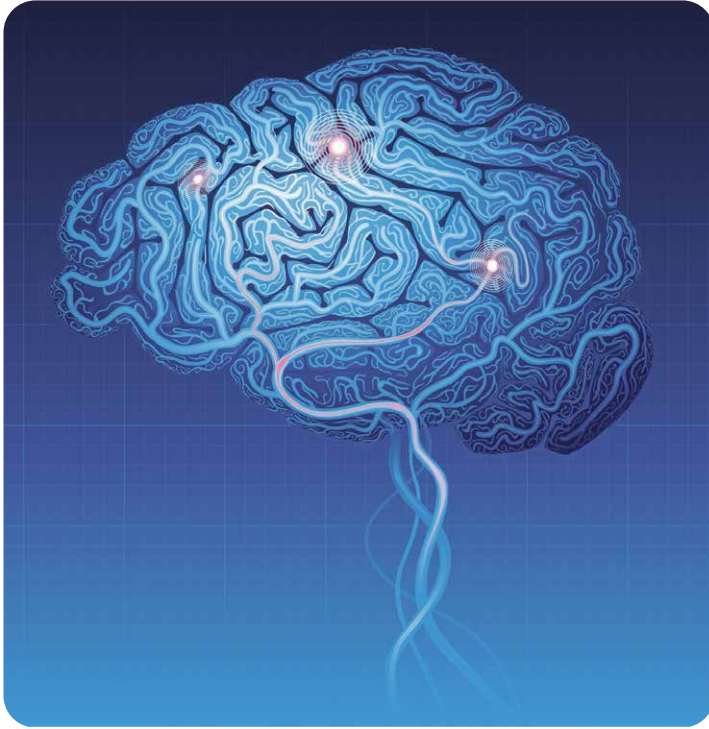
The decision to buy a lottery ticket, gamble on a stock, or buy an insurance policy often comes down to an assessment of risk. Assistant Professor of Economics **Luciano Pomatto** and Professor of Economics and Mathematics **Omer Tamuz** devised new mathematical arguments that take a person’s overall uncertainty in life into account. In a *Caltech News* interview, the researchers demonstrated their point with an example about deciding whether to buy insurance for a beat-up 1995 Volvo station wagon. “Say you are 22 years old and all you have is this car,” explained Tamuz. “Buying insurance in this case makes sense—but not so much if you are in a place in life where bigger things are at stake . . . In some sense, when there’s a lot of uncertainty in how much you are going to win or lose in other areas of life, the small gamble doesn’t really matter much anymore.” The study shows, in mathematical terms, that the strategy of making bets according to the average makes sense when a person’s background risk is high. The *Journal of Political Economy* published their study, “Stochastic Dominance Under Independent Noise,” in May.

NEUROSCIENCE DISCOVERIES

What Makes Up a Mind?



Ralph Adolphs, the Bren Professor of Psychology, Neuroscience, and Biology and the Allen V. C. Davis and Lenabelle Davis Leadership Chair and Director of the Caltech Brain Imaging Center, wants to understand how the biological brain produces the intangible mind, what the mind’s basic elements are, and how the two influence each other. In collaboration with Professor of Philosophy **Frederick Eberhardt**, Adolphs aims to bridge the chasm between biology and conscious experience and develop a complete architecture of the mind. Ultimately, a greater understanding of the mind could strengthen the basis for diagnosis and classification of psychiatric disorders. Neural data could reflect on psychological intelligence assessments in fascinating ways. “In the big picture, we hope that our work to understand what the mind is would also give us some insight into suffering,” Adolphs explained to the *Caltech Break Through* campaign. “If we knew enough about the mind that we could say, ‘Look, I can take a brain image, I can tell you if this person or this animal is suffering’—well, that would be revolutionary.”



Human Brains Gain Knowledge Through Observation

HSS neuroscientists have demonstrated how the brain chooses which strategy to employ when faced with an observational learning task: either by imitation, copying another person's behaviors to achieve the same goal, or by emulation, watching another person achieve a goal, inferring their goals, and then taking an alternate route to achieve those same goals. "Depending on the context, sometimes imitation works best, and sometimes emulation is more reliable," said **Caroline Charpentier**, postdoctoral scholar in neuroscience and lead author on the study. "Here we wanted to show whether and how the brain can keep track of both strategies in parallel and adaptively pick the best strategy in a given context." For the experiment, participants were placed in a functional magnetic resonance imaging (fMRI) machine so their brain activity could be monitored while they performed an observational learning task. The resulting fMRI data showed that the strategies correlated with activity in specific parts of the brain. The study appeared in the journal *Neuron*, and Charpentier's co-authors include postdoctoral scholar **Kiyohito Iigaya** and Professor of Psychology **John O'Doherty**.

Neurons Signal Memory-Based Decisions

A team of neuroscientists from Caltech and Cedars-Sinai Medical Center identified, for the first time, different sets of individual neurons responsible for memory-based decision-making—a hallmark of the human brain's flexibility. "We make decisions based on retrieved memories all the time," explained lead author **Juri Minxha** (PhD '18), a former HSS postdoctoral scholar in neuroscience who is now at Cedars-Sinai. "'Which restaurant should I order food from tonight?' or 'Where should I look next for my keys?'" In this study, we asked simple yes or no questions designed to cause a volunteer to access either their recent memory or their categorical knowledge." The researchers monitored single neurons in both the temporal lobe and the frontal lobe of 13 subjects. The results revealed neurons that encode memories in the temporal lobe and "memory choice neurons" in the frontal lobe—neurons that do not store memories but rather help retrieve them. The study, which lists **Ralph Adolphs** as a co-author, appeared in the June 26 issue of *Science*.

Earlier Help for Anorexia

Cindy Hagan, a research assistant professor of neuroscience in the Adolphs lab, is searching for detectable differences in brain structure and function that could help doctors identify early warning signs of anorexia nervosa and help patients sustain or regain health. "The trajectory an individual takes to anorexia is important, and we know that it relates to the brain's development," she said in an interview for the Caltech *Break Through* campaign. "There may be some clearly observable phenomena associated with the illness." For the study, Hagan is collaborating with researchers from the UCLA Eating Disorders Program and **John O'Doherty**, whose studies have begun to reveal the role of the orbitofrontal cortex in assessments of the nutritional value of food that guide dietary decisions. The researchers hope to observe differences in neural signals about nutritional values in participants who have or have had anorexia.



OTHER RESEARCH DISCOVERIES

Einstein: Not a Lone Genius

Albert Einstein is often perceived as being the sole mind behind some of the greatest discoveries in physics, but according to Robert M. Abbey Professor of History **Diana Kormos-Buchwald**, that's not the case. "He was not the genius working in an attic with a pen and paper," Kormos-Buchwald said in an interview with *Caltech News*. "Einstein may not have been working with large teams, but he was deeply embedded in the science community. Colleagues gave him advice and encouragement but also criticized his work. And he, in turn, was instrumental in guiding and challenging others." The Einstein Papers Project, under the direction of Kormos-Buchwald, found correspondence showing that two of his friends from college, Michele Besso and Marcel Grossmann, helped Einstein develop his theories of relativity through calculations and intense discussions. These letters can be found in the latest volume from the Einstein Papers Project, Volume 15, *The Berlin Years, Writing and Correspondence, June 1925–May 1927*, which was published in early 2018 and was made available online earlier this year.



Famous Economics Experiment Reproduced Thousands of Times

Nearly 60 years after Nobel laureate **Vernon Smith** (BS '49) and William D. Hacker Professor of Economics and Political Science **Charlie Plott** demonstrated the principles of bargaining and trade, HSS economists proved that the pioneers' work remains reproducible at large scales. Professor **Collin Camerer** worked with social sciences graduate student **Po Hsuan Lin** to collect tens of thousands of records from the online education company MobLab, which specializes in developing student games and experiments for economics and management. "We pulled the data of the simple market experiment," explained first-author Lin. "Even with the variation inherent in having [students] from different countries participate in the same experiment, we get nearly the same results every time. The final equilibrium prices differ by only pennies." The study was published in *Nature Human Behaviour*. Other authors include former HSS postdocs **Talsuke Imai** (PhD '16), now at LMU Munich; **Joseph Tao-yi Wang**, now at National Taiwan University; and **Stephanie W. Wang**, now at the University of Pittsburgh and MobLab.

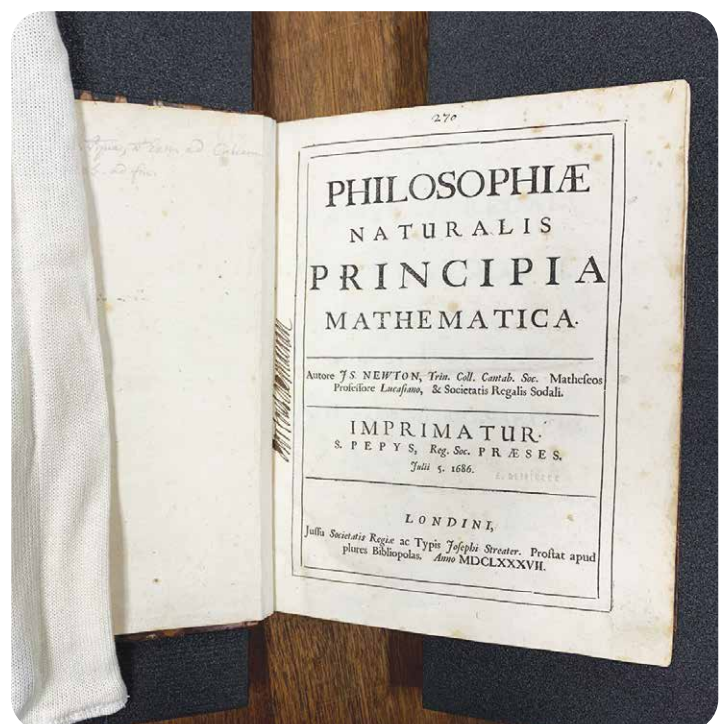


Tamuz and His Students Solve the Riddle of Random Walks

Professor of Economics and Mathematics **Omer Tamuz**, working with graduate students from the Caltech math department and a colleague from Ben-Gurion University in Israel, solved a long-standing math problem related to random walks. In the world of math, a random walk is equivalent to flipping a coin to decide which direction to go with each step. Mathematicians imagine random walks in spaces with different dimensions and geometries. For this study, the team imagined the random walks on objects with very diverse geometries. “For a random process, is it true that in the long run, everything washes out and whatever happens will happen regardless of what took place earlier?” asked Tamuz. “Or is there a memory of what took place before?” To solve the problem, the mathematicians found a new way of thinking about the connections between the geometric and algebraic properties of the groups they were studying. They shared their results in a paper titled “Choquet-Deny groups and the infinite conjugacy class property,” which was published in the *Annals of Mathematics* last summer and covered by *Popular Mechanics*.

Hundreds of Copies of Newton’s *Principia* Found in New Census

Isaac Newton’s groundbreaking book *Philosophiæ Naturalis Principia Mathematica*, known colloquially as the *Principia*, introduced the laws of motion and universal gravitation to the world in 1687. A census published in the 1950s identified 187 copies of the famous first edition, but the latest census from **Mordechai (Moti) Feingold**, Kate Van Nuys Page Professor of the History of Science and the Humanities, and his former student, **Andrej Svorencik** (MS '08) of the University of Mannheim, more than doubled that count to 386 copies. The pair have spent more than a decade tracing copies of the book around the world. “One of the realizations we’ve had,” Feingold said to *Caltech News*, “is that the transmission of the book and its ideas was far quicker and more open than we assumed, and this will have implications on the future work that we and others will be doing on this subject.” The study appeared in the journal *Annals of Science* in September, and the *New York Times*, *Science*, *Ars Technica*, and others reported on the discovery. The authors estimate that up to 200 undocumented additional copies still exist in public or private collections.



HSS ONLINE INSTRUCTION IN PICTURES: 51 Slides From 164 Courses

Does consciousness supervene on the brain?

- If we fix all the physical facts, is the state of consciousness fixed?

Philosophical Zombies: physically identical to us, but without consciousness



Preferences

X = set alternatives
 $x, y \in X$

Def: Preferences on X are a function $f(x, y)$ " $x \succ y$ ", " $y \succ x$ " or " $I \sim x \sim y$ "

Ec105:11/10/2020

PLEASE READ THIS NEWS ARTICLE

- <https://www.cnn.com/2020/11/10/tech/amazon-eu-antitrust/index.html>
- Do you agree with this? Prepare some comments for discussion
- What is Amazon accused of?
- Is this different from Walmart or Costco?

November 11, 2020 6/9



Let's compare and contrast

| | GAAP | Tax |
|-------------------|---------------------|------------------------|
| Rule-setting body | FASB | Congress |
| Governing rules | GAAP | IRC |
| Authority | SEC | IRS |
| Other name | Book | None |
| Goal | Maximize net income | Minimize Taxes Payable |
| Primary tool | Minimize expenses | Maximize expenses |
| Primary account | DD&A | DD&A |

| Summary | GAAP | Tax |
|---------------|--------|--------|
| Revenues | Same | Same |
| Expenses | Lower | Higher |
| EBIT | Higher | Lower |
| EBT | Higher | Lower |
| Taxes Payable | Higher | Lower |
| Net Income | Higher | Lower |

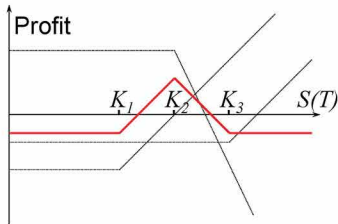
Behavioral economics in action:

Paternal nudging

Camera+ PennLawRev 2003
 Thaler & Sunstein 2008 "Nudge"

Ec109/SS209 Behavioral Econ Prof Camerer

Butterfly Spread Using Calls



Hum 11 Historical Demography
The 'Hajnal' Line



For English words, and Latin roots, as well as the reapplication of the (Latinized) initial component often because the Latin prefix and (L)

ANNO TATI

Is the addition of information on top of an existing frame the reader's

THIS IS WHY ANNOTATIONS ARE LIARS

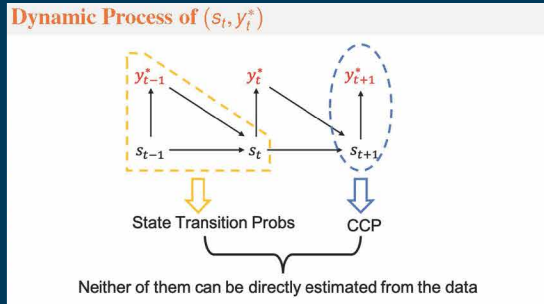
They claim not to author, when in fact they do

And when they

TN: We cannot know what it is like to be a bat!

"range of activity and a sensory apparatus so different from ours"

- > There is no sense to be made of me having the neurophysiology of the bat.
- > Behaving like a bat just tells me what it is like for me to behave like a bat.
- > Given the different perceptual apparatus there is no approximation of the mental state of the bat from my mental state.
- > Metamorphosing into a bat gives me no information now what it is like to be a bat.



Some of Arthur Sze's Fascinations

Physics...Biology...Science not only as a vocabulary but as a set of guiding ideas

Disjoint juxtapositions of size, vantage point, and scale...from atom to globe

and there's often time for tea!

或者 vs. 还是 (還是)

A. 你今天晚上想听音乐还是看电视?
 B. 听音乐或者看电视都可以。随便。

A. 你今天晚上想聽音樂還是看電視?
 B. 聽音樂或者看電視都可以。隨便。

A: 你想喝什麼茶? 紅茶还是綠茶?
 B: 紅茶或者綠茶, 都行。

A: 你想喝什麼茶? 紅茶還是綠茶?
 B: 紅茶或者綠茶, 都行。

Tycho Brahe's mural quadrant, 1598

EL QUIJOTE Y EL IDEAL HEROICO CABALLERESCO

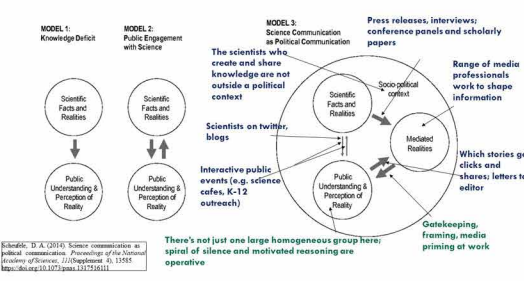
EL IDEAL



LA REALIDAD



“Science Communication as Political Communication”



II.3 The Four Types of Causes

Goal of science: to acquire knowledge necessary for scientific knowledge: understanding why sth. is as it is (and not otherwise)

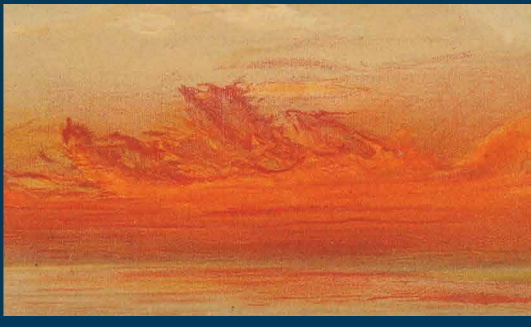
→ What is the primary cause of sth.?
Is this a good question?

1. Where does the explanation end?
→ Fundamental?
to explain 'natural change'

2. Causal network
word causal dependencies

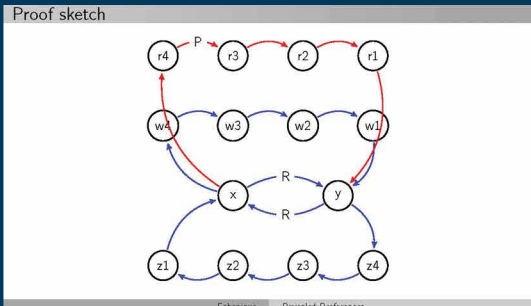
Then Aristotle presents his theory of the four causes. The Greek word for cause, *aitia*, is better translated as 'explanation'. So, Aristotle presents four ways of explaining a phenomenon (i.e.: change).

1. Material cause: what sth. is made of (matter).
{ Doe his scheme also describe objects? } what/how sth. is made



Items from the Octavia Butler archive, Huntington Library

Where New Diseases Come From: Cross-species Transmission of Germs Continues to this Day



Does money make you happy?

"Men do not desire merely to be rich, but to be richer than other men." John Stuart Mill

Firebaugh and Tach concluded that money makes people happiest when they have more of it than those in their bracket.

Social comparison and reward

Fliessbach et al., Science 2007

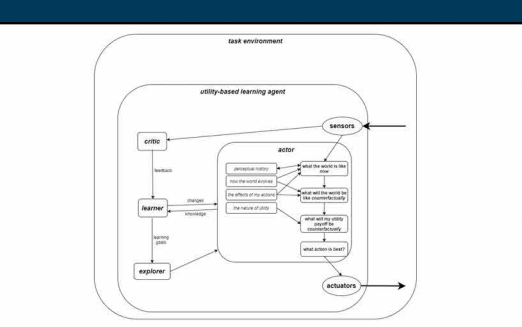
The cross-section

- in an economy with prospect theory investors who engage in narrow framing, the expected return of an asset will depend in part on:
 - the asset's own return volatility (+)
 - the asset's own return skewness (-)
 - the asset's capital gain overhang (+)

Marie Skłodowska-Curie 1867-1934

Radioactivity

- novel, unexpected; does not fit any previous notion of the structure of matter
- was made possible by refinements in chemistry; also by instrumentation in physics - M. Curie's oscilloscope
- new field: radiochemistry
- 1896 Becquerel discovers radioactivity
- 1898 Curie: Polonium
- 1904 Rutherford and Soddy: transmutation theory



Why trees are important

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. It includes species diversity; genetic diversity; and ecosystem diversity: different kind of environments (dry, wet, elevation variety, etc)

The Laws of Demand and Supply at work to predictably determine prices, allocations and create wealth.

Convergence occurs even when market participants know only their own preferences and know nothing about the theory that governs what happens to them.

An 15 Human Evolution Fall 2020 Virtual

Predicting Hunger: The Effect of Appetite and Delay on Choice

| Condition | Immediate (%) | Delayed (%) |
|-----------|---------------|-------------|
| HHI | 78 | 92 |
| SHI | 56 | 88 |
| HIS | 42 | 82 |
| SS | 26 | 70 |

FIG. 1. Percentage of unhealthy snacks chosen in all conditions

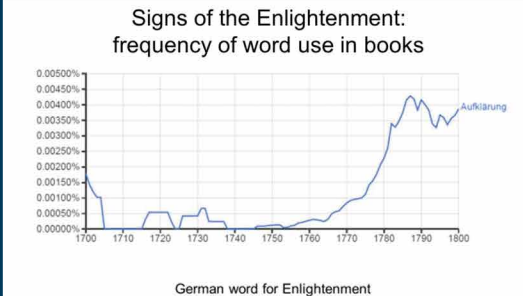
A romantic philosophy of nature

- Contrast with colonial botany/Linnaean natural history
- Unity of life – origins
- Mythical vs. empirical
- Conflicting assessments – why the controversy?
 - Skepticism of science as instrumentally (medicine, agriculture)
 - Uniting theory – genealogy (origins) – evolution
- Romantic writing and aesthetics – relation to Enlightenment ideals
 - Schleiermacher – language
 - Eigenmannshelmer – individuality, being apart
 - Saint-Augustin – essentially/ directly experience
- Status of individual in *Nature nativus*
- Methods – a priori construction and 'magic wand' of analogy
 - Compared to specimen collections
- Schelling's dismissal of natural history as 'only description'
- Oaken – primordial units of life (*Ur-schlein*) – (*Ur-floerze*) – (*Ur-knaul*) – (*Ur-sprung*)
- Romantic ideal of the researcher (*Forscher*) – individual knower

VCM/HPS 163 Science on Screen combines film viewings, reading, critical thinking, writing and discussion opportunities, studying documentary films, fiction films, and science fiction.

Science on Screen students examine how our ideas about science have been constructed at the movies and on television, and how science, technology and cinema – their histories, philosophies and visual cultures – are interconnected.

Lectured by: Hanna Rose Shell, Eleanor Searle Visiting Professor of History at Caltech and the Huntington, Assoc. Professor, University of Colorado Boulder



Aristotle on sequences of dream images

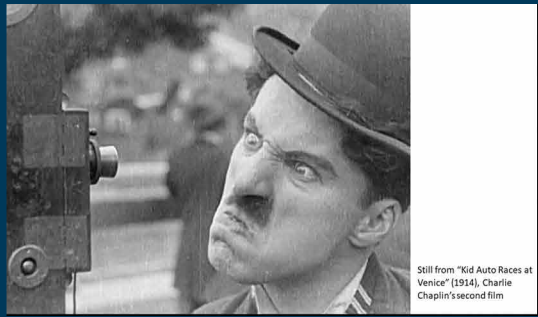
Example of the "artificial frogs" under dissolving blocks of salt

Salt block

Medium: blood

Direction: heart

Aristotle, On Dreams 461b

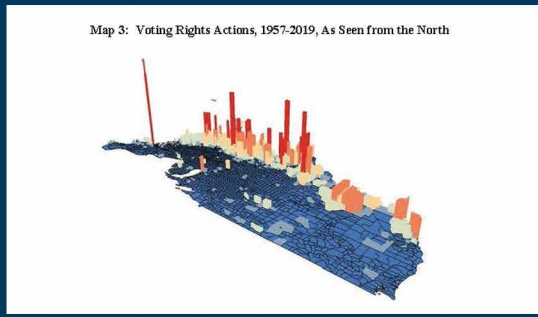
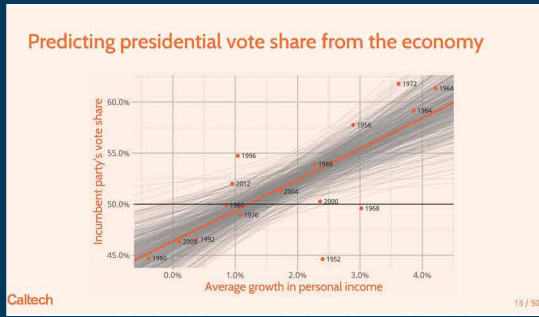


The Mentalizing Brain: the Why-How task

Is the person...

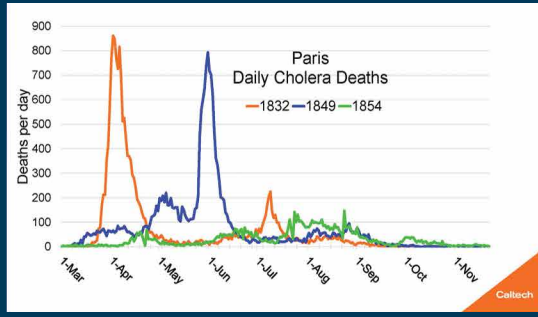
| | | |
|-----------------------|-----------------------|--|
| Why Action | helping someone? | |
| How Action | pressing a button? | |
| Why Expression | expressing gratitude? | |
| How Expression | gazing down? | |

Source: R. P. & Adolphs, R. (2014). *Unlocking the Why-How* (unpublished preprint, available at <https://www.arxiv.org/abs/1403.0011>)



John Cage challenged our understanding of the nature of music

2020-05-27 13:28:01

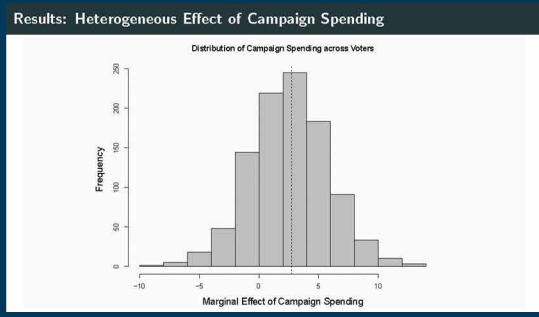


Redlining

Maps created by agents of the federal government's Home Owners' Loan Corporation between 1935 and 1940

Frederick Babcock, the central figure in early twentieth-century real estate appraisal standards, in his *Underwriting Manual* (1936): "The infiltration of inharmonious racial groups... tend to lower the levels of land values and to lessen the desirability of residential areas."

Racial segregation in housing was not formally deemed illegal until the Fair Housing Act of 1968.



Xinsheng Mu

Luciano Pomatto

Philipp Strack

PPP

$P(x) \geq P(y)$

$x \geq y \rightarrow P(x) \geq P(y)$

1 \$1

2 \$2

3 \$2.50

4 \$3

Primary and Secondary Qualities

While this seems obvious for the case of pain, it is much less obvious for the case of color. When I see a flower, it is very hard to resist the impression that the purple color that I see is there in the flower, more or less exactly as I see it.

But according to Locke, this is incorrect. Rather, the flower has a microstructure. Due to the position, orientation, and size of the particles on the surface of the flower, it reflects particles of light that have particular speeds, sizes, spins, and so on. And when these particles of light interact with my visual system, they produce a visual sensation of purple.

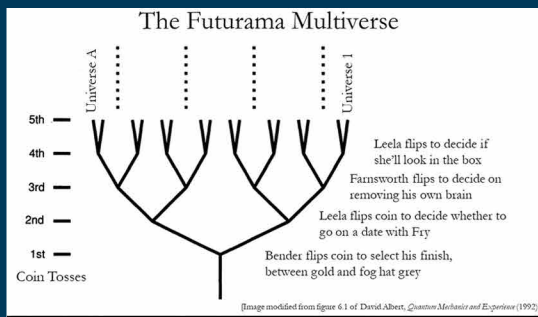
Of course, Locke did not possess our current optical theory. According to the quantum mechanical theory of light, light has both wave-like and particle-like properties. Locke, and most British natural philosophers, thought that light was made up of particles. (Scientists on the European continent were more partial to a wave theory of light.) Locke didn't know exactly which properties of light particles were responsible for color vision. It was known that light traveled at a specific velocity, so differences in color would not be due to differences in speed. One hypothesis was that color sensations were caused by the spin or angular velocity of light particles.

simple question: why study econometrics?

simple answer: the Hitchcock video ("There he is! That's him!")

remember, the point of the video (and the class) is that getting causality wrong ...

November 13, 2020 1 / 2



Amazon fights disclosure

Hurrah! Amazon will finally disclose finances for its Amazon Web Services cloud business

JORDAN ROBERTS | @JORDANROBERTS | JANUARY 25, 2015 1:07 PM

From article: "Up until now — and even today — immediately following every Amazon earnings release, observers scour it for the obscure "other" revenue line for North America, which includes AWS as well as advertising services and co-branded credit card agreements, as a proxy for AWS revenue."

Caltech

Dong Yuan (d. 962)

Winty Groves and Layered Banks

impressionistic

(hemp-fiber) pima cun

HONORS AND

In January, **Jaksa Cvitanic**, Richard N. Merkin Professor of Mathematical Finance and director of The Ronald and Maxine Linde Institute of Economic and Management Sciences, became the vice president of the Bachelier Finance Society, the largest society of academics in mathematical finance.

In February, Doris and Henry Dreyfuss Professor of History **Jed Buchwald** and **Mordechai (Moti) Feingold** were appointed co-editors for *Annals of Science*.

Colin Camerer delivered the 12th Annual Kenneth J. Arrow Lecture at Columbia University in March on "Natural Strategic Thinking in the Lab, Brain, and Field."

At its (virtual) 126th commencement exercises in June, Caltech awarded PhDs to four accomplished scholars after the completion of their degrees in the Division of the Humanities and Social Sciences. The 2020 HSS graduates (with their dissertations) are:

- **Seo-young Silvia Kim** ("Three Essays in the Dynamics of Political Behavior")
- **Vadim Martynov** ("Essays on Social Learning and Networks")
- **Song Qi** ("Decision Making Under Threat: An Ecological Framework")
- **Alejandro Robinson-Cortés** ("Essays on Market Design and Industrial Organization")



The commencement ceremony also honored the HSS student prize winners:

- **Margaret Anderson** (Rodman W. Paul History Prize)
- **Leo Balestri** (Eleanor Searle Prize in Law, Politics, and Institutions)
- **David Fager** (David M. Grether Prize in Social Science)
- **Meng Jhang Fong** (John O. Ledyard Prize for Graduate Research in Social Science)
- **Nivedita Kanrar** (Hallett Smith Prize)
- **Nivetha Karthikeyan** (Eleanor Searle Prize in Law, Politics, and Institutions)
- **Victoria Liu** (Gordon McClure Memorial Communications Prize – English)
- **Lucca de Mello** (Gordon McClure Memorial Communications Prize – Philosophy)
- **Melba Nuzen** (Mary A. Earl McKinney Prize in Literature – Prose Fiction)
- **Elsa Palumbo** (Alexander P. and Adelaide F. Hixon Prize for Writing)
- **Karen Pham** (Gordon McClure Memorial Communications Prize – History; Mary A. Earl McKinney Prize in Literature – Poetry)

The 65th annual Caltech Staff Service and Impact Awards ceremony also went virtual this year, honoring the long-standing service of the following HSS staff members:

- **Rudy Hirschmann** (20 years), IT Manager for the Einstein Papers Project (EPP). Hirschmann retired in September.
- **Christopher Crabbe** (15 years), Computer Program and Software Developer for the Social Science Experimental Laboratory (SSEL)
- **Jennifer James** (15 years), Associate Editor for the EPP
- **Sini Elvington** (10 years), Assistant Editor and Office Manager for the EPP
- **Fran Tise** (10 years), Administrative Assistant

Omer Tamuz's paper "Feasible Joint Posterior Beliefs," written with Itai Arieli, Yakov Babichenko, and Fedor Sandomirskiy, won the Best Paper Award at the (virtual) 21st ACM Conference on Economics and Computation in July. The program of the conference featured 99 papers, chosen from nearly 500.

CONGRATULATIONS

Caltech President Thomas Rosenbaum appointed William R. Kenan, Jr., Professor of English **Kevin M. Gilmartin** vice president for student affairs and the Allen V. C. Davis and Lenabelle Davis Leadership Chair of Student Affairs. Prior to taking on the role of vice president on September 15, Gilmartin served as the dean of undergraduate students.

Caltech awarded tenure to **Dean Mobbs** in September.

Also in September, the Econometric Society announced the election of **Federico Echenique** as a fellow.

Echenique also served as the arXiv moderator for economic theory until the fall, when he passed the torch to **Omer Tamuz**.

The following HSS graduate students received internal fellowships to pursue their studies during Caltech's 2019–2020 academic year:

- **Sharon Chen** (Chen Graduate Fellowship, 2019–20)
- **Brenden Eum** (Chen Graduate Fellowship, 2019–20)
- **Sumit Goel** (Linde Institute Graduate Fellowship, 2019–20)
- **Wade Hann-Caruthers** (PIMCO Graduate Fellowship in CMS, 2019–20)
- **Joanna Huey** (Clarence J. Hicks Scholar)
- **Seo-young Silvia Kim** (Lance E. Davis Fellowship, 2019–20)
- **Xiaomin Li** (Michael and Ruth C. Lipper Fellowship, 2019–20)
- **Yimeng Li** (Repetto-Figueroa Family Graduate Fellow, 2019–20)
- **Vadim Martynov** (Repetto-Figueroa Family Graduate Fellow, 2019–20)
- **Jeffrey Zeidel** (Clarence J. Hicks Scholar)

In addition, **Meng Jhang Fong** received a Ministry of Education Taiwan Fellowship (2019–20).

Rea A. and Lela G. Axline Professor of Business Economics and History **Phillip Hoffman** spent the year as the president of the Social Science History Association. On December 10, he gave the presidential address at the virtual association meeting to mark the end of his service.

Caltech awarded the third annual Milton and Rosalind Chang Career Exploration Prize to alumna **Nivetha Karthikeyan** (BS '20, computer science and history) for her proposed project "Intersections: Building Solidarity Through Community Archives," which intends to construct and share a new online community archive recording how people of color have historically created alliances, coalitions, and communities with other racial minorities in the United States.

In the fiscal year 2020, the research of several HSS faculty members and scholars was recognized with competitively awarded external funding:

- **Colin Camerer**, J. Stanley Johnson Professor of Economics **Matthew Shum**, Assistant Professor of Finance **Lawrence Jin**, and Assistant Professor of Economics **Yi Xin**, for "Analyzing Forced Habit Change from COVID-19 Using Large-Scale Data," from the National Science Foundation.
- **Ralph Adolphs**, for "Collection and Analysis of Gaze Tracking Data to Detect ASD in Participants," from Google.
- **Omer Tamuz**, for "CAREER: Probability on Groups and Semigroups of Probabilities," from the National Science Foundation; and a Sloan Research Fellowship from the Alfred P. Sloan Foundation.
- **Michael Alvarez**, for "VCA Los Angeles County Research," from the California Secretary of State.
- Professor of Finance and Entrepreneurship **Michael Ewens**, for "The Impact of Securities Regulation on Financial Development and Entrepreneurship," from the National Science Foundation.

The Brass Division Awards honor service to HSS and recognize teaching, mentoring, or other activities that enhance learning among Caltech students. The 2020 winners are:

- **George (Mac) Pigman**, Professor of English
- **Ritsuko Hirai-Toner**, Lecturer in Japanese
- **Anne Sullivan**, Weisman Postdoctoral Instructor in Visual Culture
- **Laurel Auchampaugh**, Division Option Manager, HSS Undergrad Options and Social Sciences Graduate Programs



WHERE ARE THEY NOW?

AFTER EARNING THEIR PHDS IN 2020 . . .

Seo-young Silvia Kim is an assistant professor in the department of government at American University in Washington, D.C.

Xiaomin LI is a postdoctoral scholar in behavioral economics and neuroeconomics in the Camerer lab.

Vadim Martynov is a quantitative researcher at Citadel in New York.

Song Qi is a research scientist at the National Institutes of Health.

Alejandro Robinson-Cortés is a lecturer in the department of economics at the University of Exeter Business School in the United Kingdom.

AFTER COMPLETING THEIR POSTDOCTORAL APPOINTMENTS IN 2020 . . .

Bowen Fung is a research advisor for the Behavioural Insights Team in Sydney, Australia.

Sichao (Kevin) He is an assistant professor in the department of economics at the University of Pennsylvania.

Jeongbin Kim is a research assistant professor in the Centre for Behavioural Economics at the National University of Singapore Business School.

Dorit Klemann is an assistant professor in the psychological and brain sciences department at the University of Iowa.

Chujun Lin (PhD '19) is a postdoctoral researcher in psychology at Dartmouth College.

Melanie Masterton Sherazi spent six months as a Terra Foundation Affiliated Fellow at the American Academy in Rome and is currently a lecturer at NYU Los Angeles.

ALSO IN THE NEWS

During the busy election year, several media outlets interviewed **Michael Alvarez**, including *Bloomberg News*, KPCC, *Marketplace*, *Vox*, *OC Register*, ABC Los Angeles, and NBC Los Angeles, about election security and fraud, mail-in voting, and voter behavior leading up to the November presidential election.

The Guardian interviewed **Jed Buchwald** in a story about the two 19th-century scholars, Thomas Young and Jean-François Champollion, who set out to decipher the Rosetta Stone. Buchwald described coming across Young's notes and included the discovery in his book, titled *The Riddle of the Rosetta: How an English Polymath and a French Polyglot Discovered the Meaning of Egyptian Hieroglyphs*.

In a March *MarketWatch* article, **Colin Camerer** commented on the economic choices inherent in saving human lives during a pandemic that is wreaking havoc on the economy.

Camerer appeared on Caltech's *The Lonely Idea* limited-series podcast, where he discussed the neuroscience of stock markets.

Assistant Professor of History **Maura Dykstra** described the inception of the new Critical Intersections: Conversations on History, Race, and Science seminar series in a #CaltechTogether spotlight, and she was quoted in a *Los Angeles Times* column on the first event in the series.

The January issue of the e-magazine *The Caltech Effect* included a video of **Frederick Eberhardt** describing his research at the interface of computer science and causation—specifically his work with zebrafish brain neurons.

The *Break Through* campaign featured **David Fager** (BS '20), who started at Caltech with plans to study mathematics but, through the social science core, found a new passion: economics. For his 2018 Summer Undergraduate Research Fellowship (SURF), Fager vetted a statistical model developed by his mentor, **Robert Sherman**, professor of economics and statistics and executive officer of the social sciences. Fager graduated in June with a double major in math and economics, and he is pursuing a PhD in statistics at Stanford University.

Caltech magazine included an interview with **Lia Halloran** (scheduled to join HSS as the artist-in-residence in the Caltech-Huntington Program in Visual Culture during winter term 2022) and Nobel laureate Kip Thorne, the Richard P. Feynman Professor of Theoretical Physics, Emeritus. They discussed their forthcoming book, *The Warped Side of Our Universe*, featuring poetic verse by Thorne alongside paintings by Halloran.

Christopher Hitchcock, the J. O. and Juliette Koepfli Professor of Philosophy and executive officer for the humanities, was quoted in a February 24 *Washington Post* column about causal reasoning—situations where one might think, for example, that a certain herbal medicine works based on anecdotal evidence.

In February, a *Science* article showcased a study by postdoctoral scholar **Kiyohito Igaya** in which he and his colleagues developed an algorithm to gain an understanding of how the human brain constructs aesthetic value. **John O'Doherty** is a co-author on the study, titled “Aesthetic preference for art emerges from a weighted integration over hierarchically structured visual features in the brain.”

The University of Melbourne reported on **Charlie Plott**'s 2018 project in which he utilized market design theory and specialized software to reform travel services for students with disabilities at a northern Melbourne school.

Jean-Laurent Rosenthal is quoted in a *Pasadena Now* article about how the coronavirus pandemic has changed technological and routine processes to become the “new normal.” “The most important and permanent change that is coming out of technology through the COVID shutdown . . . has to do with a variety of issues in communications,” Rosenthal said. “The most obvious one, the one that’s going to happen most directly for Pasadena and the L.A. area, is telecommuting.”

IN MEMORIAM



Kim C. Border

(1952-2020)

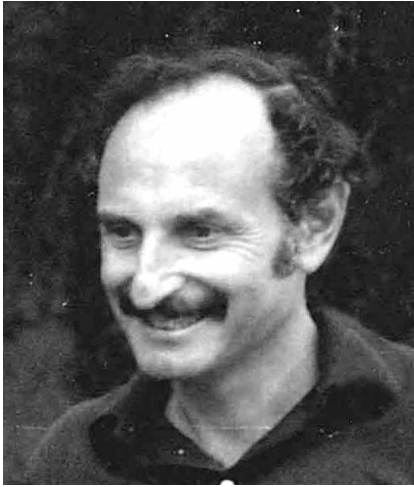
On November 19, Professor of Economics Kim C. Border (BS '74) passed away at the age of 68. "Kim was a good friend. He was honest, and straightforward, and willing to do anything to help his colleagues," said John Ledyard, the Allen and Lenabelle Davis Professor of Economics and Social Sciences, Emeritus.

Federico Echenique, the Allen and Lenabelle Davis Professor of Economics, said that Border was an "amazing colleague" and "very generous with his time and intelligence." He added that Border was always willing to sit down with colleagues and students and explain economic principles.

Border's colleagues also described him as a "Caltech guy" who knew "everybody and everything about the institution." Echenique continued, "He knew all the past division chairs and the years they served, every course requirement change, he remembered all the students, et cetera." Border received his bachelor's degree from Caltech in 1974 and his PhD in economics from the University of Minnesota in 1979. He joined the Caltech faculty more than 40 years ago, in 1979.

Border specialized in decision theory and sought to better understand how and when people behave rationally when presented with risks. Ledyard said that Border's work in this area, in particular on an economic model called expected utility theory, was "fundamental in deep and important ways." Border also worked in an area known as incentive, or institutional, design, applying insights from mathematical areas to design incentives to solve resource allocation problems. He derived a mathematical statement in 1991, now known as Border's Theorem, that put constraints on what can and cannot be done in auctions.

Border authored three textbooks, including *Infinite Dimensional Analysis: A Hitchhiker's Guide* (1994), which has been reprinted several times. Ledyard called the book "beautiful" and said that Border was an exceptional writer. Border was the director of graduate studies for social sciences from 1994 to 1996, the executive officer for the social sciences from 1995 to 1999, and the chair of the faculty from 1999 to 2001. He was on the editorial board of *Economic Theory* from 1990 to 2000 and was a panelist at the National Science Foundation's Research Fellowship Program in 2003 and 2004.

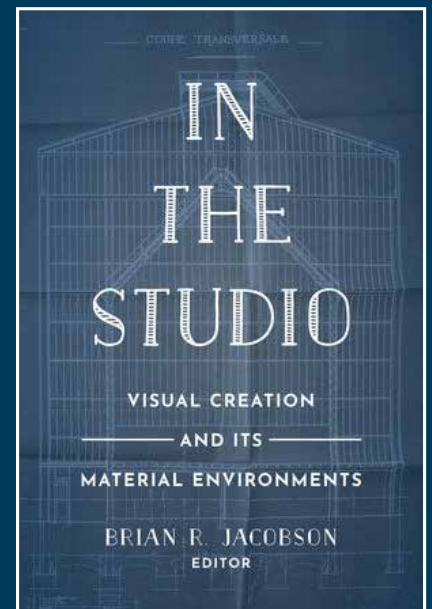
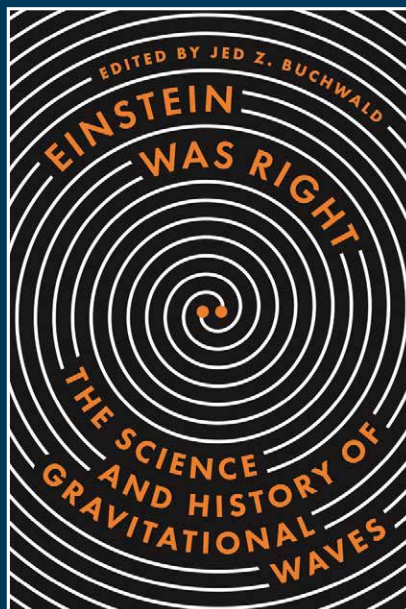
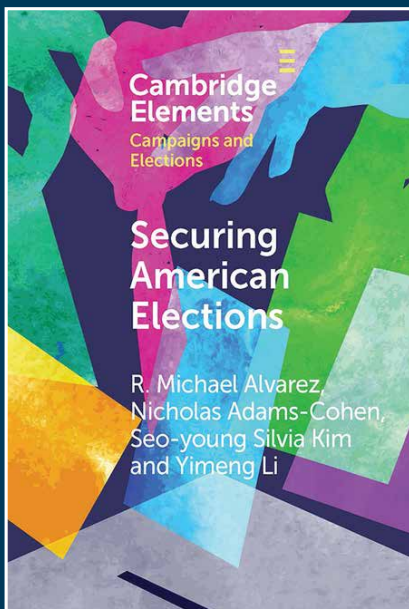
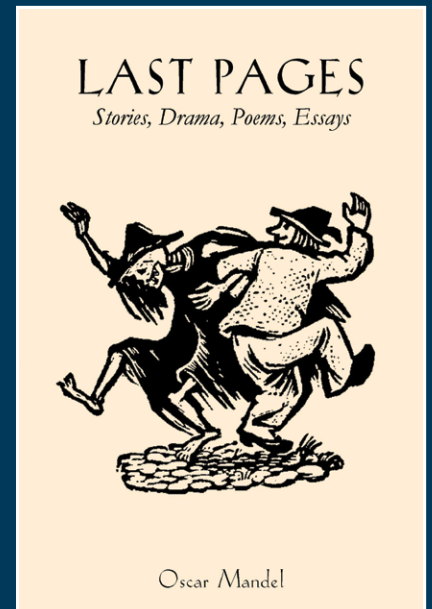
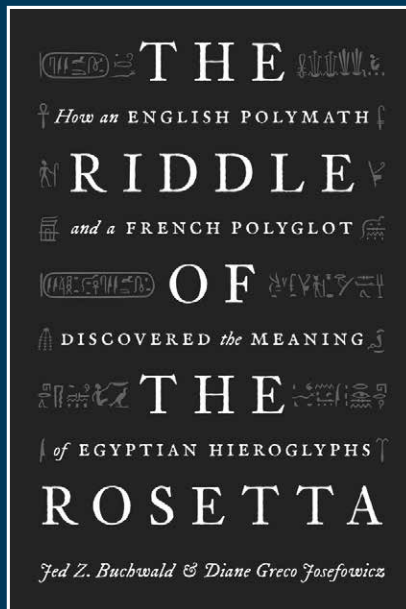


Louis Breger (1935-2020)

Professor of Psychoanalytic Studies, Emeritus, Louis Breger passed away on June 26 at the age of 84. He joined Caltech in 1970 and retired in 1994. His research centered on dreams, reformulations of psychoanalytic theory, psychotherapy process and outcome, personality development, and the application of psychoanalysis to literature. "He was a friendly, warm, and supportive colleague, and a brilliant teacher whose psych classes were always packed with adoring Caltech students," said Robert Rosenstone, professor of history, emeritus. "When, on several occasions, we co-taught classes, I was dazzled by the breadth of his knowledge and his ability to bring to life for students what are often considered difficult concepts and ideas."

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Alumnus James Gerard (PhD '85) and his wife created a new graduate fellowship in the social sciences.

The Banks-McKelvey Memorial Lectureship

Howard Jessen (BS '46) endowed this new lectureship in political economy, which memorializes Professor of Political Science Jeffrey Banks and Edie and Lew Wasserman Professor of Political Science Richard McKelvey.

Roger and Marjorie Davisson Fund for Teaching Excellence

Roger Davisson (BS '65, MS '66) and his wife, Marjorie, created this fund to support humanities education as part of their gift to the Caltech *Break Through* campaign.

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Adelaide Hixon supported the continuing operations of the Hixon Writing Center through an additional gift from her estate.

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