SUMMER/FALL 2025

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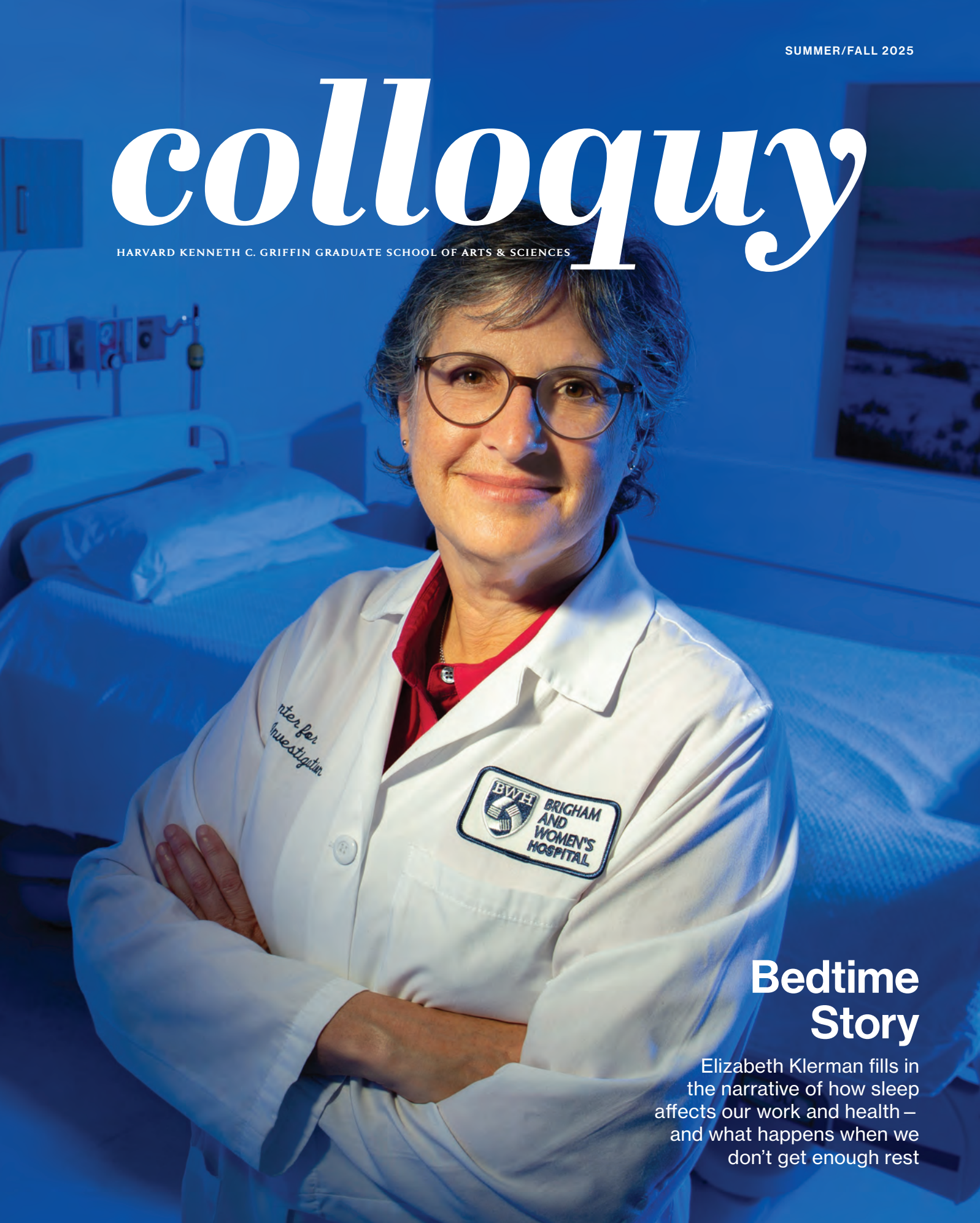
HARVARD KENNETH C. GRIFFIN GRADUATE SCHOOL OF ARTS & SCIENCES



Bedtime Story

Elizabeth Klerman fills in the narrative of how sleep affects our work and health – and what happens when we don't get enough rest

Share Your Expertise with Harvard Griffin GSAS Students

Engage with current Harvard Griffin GSAS students through the Virtual Coffee program to offer guidance around life as a graduate student, impart strategies for talking with their advisor, provide insight into different career paths, discuss their scholarship and research, or simply share your journey at and after Harvard. Look out for the annual call for participation in late September and help students make the most of their time at Harvard Griffin GSAS! Matches are conducted on a rolling basis throughout the year but are not always guaranteed depending on the participation pool. We endeavor to make as many strong connections as possible and encourage you to sign up regardless of whether you are matched! Contact *gsaa@fas.harvard.edu* with any questions.

Looking for more ways to connect with graduate students? The Mignone Center for Career Success's Firsthand Advisors platform provides scheduling and connection tools to engage in "flash mentoring." Alumni can offer to engage in a mock interview, review a resume or CV, or have a career chat. Sign up now at *harvardmcs.firsthand.co.*

Share professional development opportunities with Harvard Griffin GSAS students by posting full-time, internship, or short-term positions to the Mignone Center for Career Success's Job and Internship Database for free through Crimson Careers at *harvard-csm.symplicity.com/employers/.*

PHOTOGRAPHY: TONY RINALDO

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Contact *Colloquy:* *Send your questions and comments about the magazine to gsas.comms@fas.harvard.edu. We'd love to hear from you!*

COVER PHOTOGRAPHY: JOHN SOARES

IN THE PERIOD OF GREAT UNCERTAINTY that we continue to experience as a University, Harvard Griffin GSAS remains devoted to our mission of scholarship and critical inquiry at the highest level. Upholding these tenets remains our priority on behalf of all our students. As President Alan Garber shared in a message earlier this year, our international peers—our friends, colleagues, and students—are vital members of our community, and we will continue to meet our challenges with integrity and resolve.

Given these challenges, it is the stories—of our students, our alumni, and Harvard's global impact—that we want to share and amplify. In this issue, you will learn about neurologist Elizabeth Klerman, PhD '90, and her research on the impact of sleep—and sleep disorders—on mental health, productivity, and performance (page 8). You will also read about the work of recent graduate Adebanjo "Banjo" Adedoja, which focuses on mitochondrial permeability's role in aging and addresses fundamental questions of cellular function and longevity (page 14). Happily, for this year's Commencement, Adedoja was nominated by fellow students, graduate program administrators, and faculty, and was selected by the Harvard Griffin GSAS Student Council to serve as a Commencement Marshal. The marshals embody leadership, service, and scholarly excellence, and this immense honor is a testament to Adedoja's full personal and academic tenure at Harvard.

In May, we honored this year's Centennial Medalists and celebrated their outstanding contributions to society—contributions rooted in their graduate education and experience at Harvard Griffin GSAS. Lorraine Daston, PhD '79; Jim Yong Kim, PhD '93; Russell Lande, PhD '76; and Mary Beth Norton, PhD '69, were introduced and acknowledged through a series of personal, heartfelt anecdotes that recognized their achievements. I encourage you to learn more about their journeys (page 20).

As an alum, your engagement and perspective are valued and encourage us in our efforts to adapt and thrive as a School. Now, more than ever, thank you for championing the academic excellence of Harvard Griffin GSAS.

—EMMA DENCH
DEAN

colloquy SUMMER/ FALL 2025

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PHOTOGRAPHER: DAVID SALAFIA

Some of the Harvard Kenneth C. Griffin Graduate School of Arts and Sciences' remarkable students and alumni speak about their research, their lives, and their time at the School.

●●● **Read the full profiles and find many more at** *gsas.harvard.edu/news/topic/voices*

THE IMPORTANCE OF MENTORSHIP

Becoming a better scientist involves a few factors, the most obvious one being that you learn how to be better at doing experiments. From my thesis advisor and mentor Professor Ya-Chieh Hsu, I learned how to think critically about published work, how to design rigorous experiments, how to construct a compelling narrative, and how to ask the right questions. But beyond this, Ya-Chieh has taught me a lot of non-experiment skills that are crucial to succeeding as a scientist. Perhaps the most important skill I've learned from her is understanding different points of view.

HANNAH TAM, PHD STUDENT
Biological and Biomedical Science

THINKING OF THE NAVAJO NATION

Now that I'm pursuing my PhD in science, I want to go back to the rez (Navajo land) and encourage people to do the same. As I've matured as a student, I've seen all the possibilities for myself—for instance, I've seen people launch biotech start-ups—and now I think, "What's stopping me as a rez kid from doing the same?" In the back of my mind, I am always thinking about the Navajo Nation and the Navajo economy, and how I can help uplift both. It grounds me to think about what the future could be if we focused on academics, and how perhaps one day I'll be able to walk into a coffee shop on the rez and have a conversation with a stranger about science.

ROBINSON TOM, PHD STUDENT
Engineering Sciences

WHERE AFRICA AND CHINA MEET

Some 70 percent of Africa's general international revenue depends on basic commodities: South Africa supplies the world with gold and platinum, Kenya exports tea, Nigeria supplies oil, and so on. This commodity economy meant Africa was basically at the bottom of the supply chain. A lot of added-value economic activity takes place elsewhere, which means that profit also takes place elsewhere. . . . In Africa, Beijing saw countries that were like themselves 20 or 30 years before, so building out basic infrastructure in these "Global South" markets would create both new Chinese consumers for Africa's commodities and investment opportunities for Chinese capital.

BULEILANI JILI, PHD '25
African and African American Studies

SCIENCE WITH CONCRETE IMPACT

I searched for labs where I could conduct my PhD research and was drawn to the Lukin Group at Harvard. It's large, about 50 people, with subgroups that operate like labs themselves. The one that caught my eye focused on quantum networking. I liked that it was trying to bring the quantum world closer to the "human-scale" one, with applications that could be practically useful. For example, in the future, quantum networking could revolutionize encryption by making encryption keys impossible to intercept. I guess that's the attraction for me: I enjoy doing science that could have a concrete impact.

PIETER-JAN STAS, PHD STUDENT
Physics

PHOTOGRAPHERS: COURTESY HANNAH TAM, TONY RINALDO (JILI), ERICA GREEN OF HARVARD UNIVERSITY NATIVE AMERICAN PROGRAM (TOM), AND NILES SINGER (STAS)

A Transformation in Teacher Training

Bok Center Director and FAS Professor Karen Thornber

Faculty of Arts and Sciences (FAS) Professor **Karen Thornber**, PhD '06, celebrated her first year as Richard L. Menschel Faculty Director of the Derek Bok Center for Teaching and Learning on July 1. Described by FAS Dean Hopi Hoekstra as "a global scholar, an innovative and passionate teacher, and an experienced academic leader," Thornber leads the Bok Center's work with faculty, graduate students, undergraduates, and postdocs, to identify and implement the most effective, evidence-based practice strategies for transformational teaching and learning in today's rapidly changing educational environment.

Along those lines, Thornber has overseen a pilot of required teacher training with almost all of the nearly 200 instructional staff for the undergraduate Program in General Education. In line with the priorities of the 2023 Final Report from the GSAS Admissions and Graduate Education (GAGE) Working Group, Thornber says the Bok Center's goal is to train and support all graduate student teachers in the months and years ahead. "Right now, only about 10 to 20 percent of new graduate student teaching fellows in the FAS receive any training at all," she says. "Our goal is that, starting in the fall of 2025, all new TFs assigned to FAS courses will receive training. That's 500 to 600 students. We'll introduce the basics of teaching, the nuts and bolts, and then build on toward more advanced skills. By fall 2026, we'll scale up so that we are training any graduate student teaching in the FAS. It will be a huge transformation."

••• **The above copy incorporates language from the *Harvard Gazette*. Read more at** *https://bit.ly/gsasteachers*

CUTTING DRUG COSTS, EMBRACING AGING, DEMYSTIFYING AI—AND MORE

Eight of Harvard Griffin GSAS's brightest PhD students presented their research to a rapt crowd at Sanders Theatre last April during the annual Harvard Horizons symposium. Their work ranged from innovations in chemistry that could dramatically lower the cost of producing many pharmaceuticals, to lessons on aging gracefully gleaned from the work of three Slavic women poets. Now in its 12th year, the Harvard Horizons program provides in-depth mentoring on the art of effective presentation and offers scholars opportunities for long-lasting community, mentorship, and professional and academic growth.

••• **Watch the 2025 Harvard Horizons Symposium at** *https://bit.ly/harvhorizons2025*

FROM THE *COLLOQUY* PODCAST

"If we want to create a more equitable future, we must understand our past. In understanding our past, we are able to speak truth and work towards mending harm."

– VICE PROVOST FOR SPECIAL PROJECTS AND HARVARD T.H. CHAN SCHOOL PROFESSOR SARA BLEICH, PHD '07, speaking about the Harvard & the Legacy of Slavery Initiative on the *Colloquy* podcast: *https://bit.ly/harvardlegacy*

Clark Is New Dean of Students

On March 24, **Dr. Lakshmi Clark** joined Harvard Griffin GSAS as dean of students. Formerly the senior director of student affairs at Harvard Law School, Clark brings decades of experience in higher education to her new role, including many years serving students with disabilities at New York University. "Over the course of the interview process, I was impressed by Lakshmi's dedication to the full student experience through thoughtful planning and proven strategic leadership, and I am looking forward to our work together," wrote Dean Emma Dench in a letter to the Harvard Griffin GSAS community announcing the appointment. As a new member of the School's senior leadership team, Clark says she looks forward to "strategically engaging students at various points during their program" to "make substantial improvements in their overall experience."

••• **Read an interview with Dean Clark at** *gsas.harvard.edu/news/connector*

Clark

DEMING NAMED COLLEGE DEAN

Deming

Harvard Kennedy School and Harvard Graduate School of Education Professor **David Deming**, PhD '10, was named Danoff Dean of Harvard College in May. A nationally recognized scholar at the intersection of education, labor markets, and economic inequality, Deming has held multiple leadership roles during his time at Harvard, serving as director of the Malcolm Wiener Center for Social Policy at the Kennedy School and as the School's academic dean. Announcing his appointment, Edgerley Family Dean of the Faculty of Arts and Sciences Hopi Hoekstra called Deming "an inspiring academic leader," who is "uniquely well-suited to lead the College at this consequential moment in Harvard's history." Harvard President Alan M. Garber, PhD '82, called Deming "a stellar researcher, a great educator, a beloved faculty dean, and a role model to students and faculty alike." He began his new role July 1.

••• **Read the complete announcement at** *news.harvard.edu/gazette/story/2025/05/david-deming-named-harvard-college-dean.*

CHEN WINS WEINTRAUB

Chen

Xi Dawn Chen, a PhD student in Harvard's Department of Stem Cell and Regenerative Biology and the Program in Systems was named a recipient of the 2025 Harold M. Weintraub Graduate Student Award in March. Presented by the Fred Hutch Cancer Center, the award recognizes outstanding achievement and exceptional research in the biological sciences. Chen received the award for her contributions to the understanding of gene editing and its potential applications in medicine – specifically, her research on the development of an innovative gene-editing tool known as Helicase-Assisted Continuous Editing (HACE). "I hope that the tools I'm developing now will contribute to a future where we can precisely control gene expression to treat previously untreatable conditions," she says. "I want to help create diagnostics and therapeutics that lead to better health for everyone."

••• **Hear Chen explain her research on the *Colloquy* podcast:** *gsas.harvard.edu/news/colloquy-podcast-step-closer-personalized-medicine.*

••• **Stay up to date with the latest news and research from the Harvard PhD community. Subscribe to the *Research Matters* newsletter at** *gsas.harvard.edu/news*

PHOTOGRAPHERS: TONY RINALDO (THORNBER, HARVARD HORIZONS, CLARK); COURTESY OF DAVID DEMING (DEMING); COURTESY OF XI DAWN CHEN (CHEN)

WHO GOES TO PRISON NOW?

DRAWING ON HISTORY, PUBLIC POLICY, AND DEMOGRAPHIC DATA, HARVARD SOCIOLOGY PROFESSOR **CHRISTOPHER MULLER**, PHD '14, EXPLORES THE SHIFTING DYNAMICS OF RACIAL AND EDUCATIONAL INEQUALITY IN THE US CRIMINAL JUSTICE SYSTEM. HIS RECENT RESEARCH REVEALS THAT WHILE THE GAP IN PRISON ADMISSIONS BETWEEN BLACK AND WHITE AMERICANS HAS NARROWED IN RECENT DECADES, EDUCATIONAL DISPARITIES HAVE GROWN MORE PRONOUNCED. IN THIS INTERVIEW, HE DISCUSSES THE POLITICAL AND ECONOMIC FORCES BEHIND THESE TRENDS AND WHAT THEY REVEAL ABOUT MASS INCARCERATION—AND INEQUALITY— IN TWENTY-FIRST-CENTURY AMERICA.

In a recent paper, you used government data from 1984 to 2019 to study prison admissions, focusing on non-Hispanic Black and white Americans between the ages of 20 and 39. You broke the group down by race and whether or not the admits had a college degree. What did you find?
Yes, this is work with Alex Roehrkasse at Butler University. We found that racial inequality in prison admissions is narrowing, and educational inequality in prison admissions is widening. At the end of the twentieth century, the disparity in the prison admission rates of Black and white Americans was comparable in magnitude to the disparity in the prison admission rates of people with and without a college education. But today, educational inequality is much greater than racial inequality in prison admissions for all major crime types. To give one example, in 1992, Black Americans with no college education were 14 times more likely than white Americans with no college education to be admitted to prison for a drug offense. By 2019—the end of our

PHOTOGRAPH: NILES SINGER

"The prison admission rate for Americans with no college education and for all offense types has risen dramatically . . ." —CHRISTOPHER MULLER

study period—that number had fallen to 1.5. In contrast, in 1992, Black and white Americans with no college education were, respectively, 11 and 13 times more likely than Black and white Americans with some college education to be admitted to prison for a drug offense. But by 2019, those numbers had risen to 22 and 31, respectively.

There have been absolute declines in the prison admission rates of Black Americans with and without a college education, due mainly to declines in admissions for drug and property offenses. However, the troubling news is that the prison admission rate for Americans with no college education and for all offense types has risen dramatically, particularly for white Americans.

In 1999, Black Americans without a college degree were admitted to prison for drug crimes at a rate of 1,405 per 100,000 people. By 2019, that number was 494 per 100,000—a decrease of nearly two-thirds. What were the main reasons for such a big drop? At the same time, white admissions to prison for all kinds of crimes increased sixfold. Can the data tell us why there was such a big jump?
Ours is a descriptive study, so we can't say for sure what the causes of these trends are. But I think it's notable that other studies have observed very similar patterns in economic mobility and life expectancy. Recent research from Opportunity Insights has shown that the economic prospects of Black Americans born poor have improved, while the economic prospects of white Americans born poor have worsened. Other work by Princeton economists Anne Case and Angus Deaton documents that the Black-white life expectancy gap has narrowed, while the gap between people with and without a bachelor's degree has expanded. In explaining these trends, some scholars have noted that the large-scale job loss among low-education workers that hit Black Americans in the mid-20th century began to more significantly affect white Americans in the 21st century. I think it's likely that these patterns in imprisonment, economic mobility, and life expectancy all reflect broad shifts in the life chances of Black and white Americans without a college education.

Changes in policy also probably played a role. For example, sociologists Katherine Beckett and Marco Brydolf-Horwitz have argued that the de-escalation of the drug war in American cities could be one reason for the dramatic decline in Black Americans' prison admission rate for drug offenses.

Finally, what's the takeaway from your research? Has education level become a more powerful predictor than race for whether someone would go to prison?
American imprisonment has been characterized by large Black-white inequality since at least the end of the Civil War. Given the centrality of racial inequality to the history of US imprisonment, the growing salience of educational inequality even in this domain is another indication of just how important the educational divide has become for understanding inequality in the United States more generally.

That said, racial inequality in imprisonment remains large, and Black Americans bear a vastly disproportionate share of the indirect harm of incarceration. This is because the enduring effects of slavery have made class boundaries among Black Americans much more permeable than they are among white Americans. Persistent segregation has meant that middle-class Black Americans are much more likely than middle-class white Americans to live in or near poor neighborhoods. And because of historically low levels of wealth among Black families, middle-class Black Americans are also more likely than comparable white Americans to be offshoots from poor family trees. As a result, Black Americans with high levels of education and income are more likely than white Americans with low levels of education and income to have a family member imprisoned or to live in a neighborhood with a high imprisonment rate. Any understanding of inequality in incarceration needs to accommodate this complexity.

CURRICULUM VITAE

Harvard University
Professor of Sociology, 2023–Present

University of California, Berkeley
Associate Professor of Sociology, 2022–2023
Assistant Professor of Sociology, 2016–2022

Columbia University
Robert Wood Johnson Foundation Health & Society Scholar, 2014–2016

New York University School of Law
Research Associate, Brennan Center for Justice, 2004–2007

BEDTIME STORY

Elizabeth Klerman fills in the narrative of how sleep works—and what happens when we don't get enough

BY PAUL MASSARI | Photographs by John Soares


Center for
Clinical Investigation
BWH
BRIGHAM
AND
WOMEN'S
HOSPITAL

“Beth, what’s going on?!”

Elizabeth Klerman’s cousin said with concern as their car started to veer across the lanes of the highway. The two were driving to see April 2024’s solar eclipse, visible over parts of the US, Canada, and Mexico. Klerman had fallen asleep at the wheel.

“It was one of the most terrifying experiences I’ve ever had in my life,” she says. “I was not aware I’d fallen asleep. If I’d been alone in that car, I would not have known until I hit a rumble strip—or a tree. I knew I was sort of tired, and I thought, ‘Oh, I can last another half hour when we’re gonna switch.’ Nope.”

If anyone should be a good judge of when and how much to sleep, it should be Klerman, MD/PhD ’90. A professor at Massachusetts General Hospital’s (MGH) Department of Neurology, and a faculty affiliate of Harvard Medical School’s (HMS) Division of Sleep Medicine, Klerman’s three decades of painstaking research shed light on the way sleep impacts physiology, from cognitive performance and subjective alertness, to hormones, blood pressure, and renal function. As her own experience exemplifies, Klerman contends we’re almost certainly not getting enough rest, we probably don’t know how tired we are, and our sleep debt is affecting our work and health.

No Mistake

When confronted by sleep skeptics, Klerman offers a quote from the late Allan Rechtschaffen, a founder of the field of sleep research and director of the University of Chicago Sleep Laboratory for over four decades.

“He said, ‘If sleep doesn’t serve an evolutionary purpose, it’s the greatest mistake evolution ever made,’” she remembers. “If you think about it, the key things that usually drive evolution are sex, eating, and reproduction. Also defending yourself. And you don’t do any of those when you’re asleep. So evolutionarily, sleep must be doing something, because otherwise, sleep wouldn’t still occur. Evolution would have eliminated it if it weren’t beneficial.”

It turns out that sleep does nearly everything, shaping “immune function, metabolism, memory, learning, and other vital functions,” according to HMS’s Division of Sleep Medicine. The impact of sleep deprivation on personal and public health is similarly wide-ranging. A 2023 article in the British medical journal, *The Lancet*, asserted that sleep deficiency “adversely affects health across the entire lifespan, quoting data from the US Centers for Disease Control showing that “the prevalence of less than 7 [hours] sleep per 24-[hour] period overlaps with poor general health, poor mental health, poor brain health (i.e., increased stroke), obesity, and high blood pressure.” The authors called for sleep “to be promoted as an essential pillar of health, equivalent to nutrition and physical activity.”

The economic costs of sleep debt are no less daunting. “Why Sleep Matters,” a 2016 study by the Rand Corporation, reported that “lack of sleep among the US working population is costing the economy up to $411 billion a year, which is 2.28 percent of the country’s GDP.” If workers increased “nightly sleep from under six hours to between six and seven hours” the authors wrote, the nation could recoup $226.4 billion in lost productivity.

The Rhythm of the Night

When and how long we sleep is primarily determined by two factors. The first, which Klerman has studied extensively throughout her career, is circadian rhythms, the sleep-wake cycle that helps determine when we feel alert or sleepy based on the time of day. In humans, the circadian clock is located in the suprachiasmatic nucleus of the brain’s hypothalamus. The clock receives information about light from the eyes and uses it to coordinate the timing of bodily processes. “If you’ve ever had jet lag,” Klerman says, “you know that you’re awake when you don’t want to be awake, and you’re sleeping when you don’t want to be sleepy, because your circadian clock is saying,

'Oh, it's time to be awake,' or 'It's time to be asleep.'"

The second factor is homeostasis—basically, how long you've been up. "The longer you've been awake, the more likely it is that you're going to fall asleep," Klerman explains.

For the most fortunate of us who don't do shift work, or have infant children or excitable animal companions, the circadian clock and homeostasis align. We work through a "normal" waking day and feel tired just as our circadian clocks tell us it's time to settle down. Light is the most potent stimulus of the circadian system—it's why clinicians recommend leaving blue light-emitting smart phones and other devices out of the bedroom at night. But in human beings, the circadian clock actually promotes wakefulness toward the end of the day, when the sun has often set. Similarly, it promotes sleep in the early hours of the morning. "The hypothesis is that the circadian system's apparently paradoxical signals—promoting wake toward the end of waking and sleep toward the end of sleeping—enable consolidated sleep and wake episodes," Klerman says.

How Much Is Enough?

The question of how much sleep humans need has been batted about for decades. Klerman, in collaboration with the Dutch researcher Derk-Jan Dijk, then at Boston's Brigham and Women's Hospital, addressed this in 2007. The two researchers recruited healthy younger and older participants with no sleep disorders. Participants were asked to keep track of when they went to sleep and when they awoke for three weeks before the inpatient portion of the study, establishing a baseline average of the rest they were getting. "People were sleeping on average anywhere between 6.5 and 10 hours," Klerman says. "Then they came into the lab."

The first night, Klerman and Dijk had participants keep to their habitual sleep duration and timing, monitoring brainwaves, eye movements, and muscle tone ("polysomnography"). The next day, their sleepiness was measured with the multiple sleep latency test (MSLT)—four or five scheduled nap opportunities, each lasting up to 20 minutes, spaced two hours apart throughout the day. If they did not fall asleep within the 20 minutes, the trial ended. If they did, they were awakened after they fell asleep so as not to spoil the next test. "That first day, some of the people were falling asleep before the technician had left the room," Klerman says.

For the next three to seven days, the researchers dramatically expanded the participants' sleep opportunities. "People got twelve hours of sleep opportunity during the night, and then they were awake for four hours and then four hours of another sleep opportunity," Klerman explains. "They were not allowed out of bed during those twelve hours or four hours—no phones, lights, reading, or knitting—because we just wanted to see how much sleep they got."

Many of the participants had come into the study confidently claiming they got plenty of sleep, all they needed. But on the first day of expanded sleep opportunity, younger people in particular crashed. "Everyone slept more, particularly the people in the 18 to 30 age range, who slept on average for 12.5 hours," Klerman reports.

Those who came into the study sleeping on average eight or nine hours a night slept more on the first night, then quickly

reverted to their mean. But those who had been sleeping six or seven hours needed days of increased sleep before finding a new homeostatic level—slightly under eight hours for older participants, slightly over eight hours for the young.

Klerman says the study demonstrates that, to get enough sleep, you need enough opportunity. "No one is 100 percent sleep efficient," she says. "To get 7.5 or 8 hours of sleep, you need to be in bed for more than eight hours."

More than that, Klerman says the research shows it's not possible to oversleep.

"Believe me, you can overeat," she says. "Give me a piece of chocolate cake at almost any time of day. I will eat it. But this study is strong evidence that you cannot oversleep if you're bored. If you could sleep when you're not tired, these people would have slept, rather than stay awake for multiple hours in the dark with nothing to do, and their MSLTs wouldn't have changed. But by the end of the study, almost no one was falling asleep on the MSLTs."

Like a Sneeze

Klerman's research shows how much sleep we probably need—and that most people probably fall short. But what's the impact on cognition when we're deprived of sleep or when our rest comes at odd hours?

When the US Air Force Office of Scientific Research wanted to know the answer to that question, it funded Klerman and her colleagues. "They were thinking about what happens if personnel are awake for long periods of time and then get a lot of sleep, but they're effectively not on a 24-hour day because they're awake for 24 hours, and then we let them sleep," Klerman explains. In other words, the AFOSR wanted to know what happens not only when service members are sleep-deprived but also when opportunities for sleep fall outside of normal circadian rhythms.

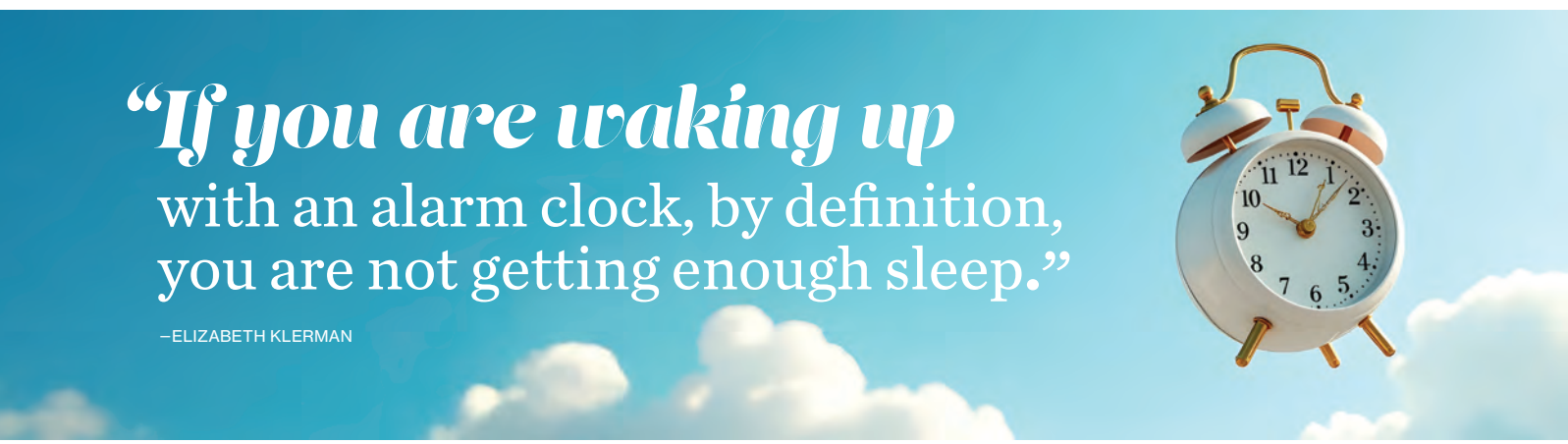
Klerman performed a study based on a 42.85-hour day, with 10 hours of sleep opportunity every period—equivalent to sleeping 5.5 hours during a normal 24-hour day. "The experiment was designed so that the people slept for 10 hours under baseline, under the chronic sleep restriction conditions, and under recovery," Klerman says. "Five and a half hours is not that far off from what lots of people do in real life." The 42.85-hour day also desynchronized the internal circadian rhythms from behaviors such as sleep/wake, and mood and performance.

The researchers found a difference in the quality of participants' sleep depending on what part of a normal day the opportunity occurred. "In some circadian phases, they slept better than others," Klerman says. "So, if those 10 hours were scheduled during the usual waking day—the equivalent of 8:00 a.m. to 6:00 p.m.—they didn't sleep as well as if they were scheduled from 8:00 p.m. to 6:00 a.m."

Over the course of a month, the chronic sleep deprivation and forced desynchrony did indeed degrade participants' performance on a range of tests, including those that measured reaction time, insight, and computation skills. But the results differed based on when the tests were administered.

"Even after three weeks on this protocol, people did really well on the tests for the first six hours after they woke up," Klerman says. "That's when they would say, 'See, I got enough sleep.' But after that first six hours, wow, did they deteriorate quickly. So, there's this short-term recovery from sleep that can function even when you're really sleep deprived but it doesn't last."

Even more surprising, participants' subjective perceptions of sleepiness or alertness showed no correlation with their performance on cognitive tests. "Every time we measured



WAKE UP CALL: The US Air Force Office of Scientific Research contacted Klerman to understand what happens to service members when they are deprived of sleep or their opportunities for rest fall outside of normal circadian rhythms.

performance, we also asked about alertness—so, we know the relationship on a test-by-test basis," Klerman says. "The graph we got looked like a sneeze. The people who said they felt awake and alert performed no better than those who said they were tired. There was no relationship between self-reported alertness and actual performance."

The results, Klerman says, provide evidence that the brain has a difficult time with self-assessment, particularly when tired—just as Klerman did on her drive to see the solar eclipse. "If someone tells me they're tired, then I believe them," she says. "But if they tell me they're not tired, I don't believe them. And the correlation is worse in people who are chronically sleep-restricted."

Previous research had documented the cognitive impact of sleep deprivation, but Klerman says the study's real breakthrough was in establishing for the first time the three independent factors related to sleep that influence cognitive performance and subjective alertness: circadian rhythms, the length of a waking episode, and sleep debt (chronic sleep restriction). "These might seem obvious, but no one had ever shown before that there were these three impact factors that work together to influence cognition and our perception of alertness," she says.

Take the Time. Leave the Alarm Clock.

Despite an increased interest in sleep from medical researchers and the public, Klerman says there's no magic pill on the horizon that will help people get a good night's rest. That's the bad news. The good news is, most folks don't need one.

"Why should you take a medication for something that you can do by yourself?" she asks. "Give yourself time to sleep—at least 8.5 hours of opportunity to get a solid eight hours of rest."

Carving out that time may not always be possible for those who live with children or animals, work multiple jobs, or do shift work. For the rest of us, Klerman recommends settling down to bed rather than staying up late to watch a horror movie, check social media or the news, or do the bills. And, if at all possible, ditch the alarm clock.

"The German chronobiologist Till Roenneberg, who's a very famous sleep researcher, compares sleep to a washing machine," she says. "Would you turn off a washing machine before the rinse cycle is over? Then why would you want to wake up before your body tells you to? That's why, if you are waking up with an alarm clock, by definition, you are not getting enough sleep. Also, if you are still tired after being in bed for eight or more hours or if your bedpartner says you snore loudly, stop breathing during sleep, or kick badly, please talk with your doctor about whether you have a sleep disorder."

In the tradition of "physician heal thyself," Klerman puts the knowledge she creates into practice in her own life.

"When I give talks about sleep, someone often says, 'Well, how much sleep do you get?' I tell them, 'Eight hours. And I'm in bed for eight and a half hours.' I'm a busy person but I'm in bed at 9:45, I read for 10 to 15 minutes to let my body calm down, turn off lights at 10:00 p.m., and sleep until I wake up. Usually without an alarm clock!"

Longevity for Humanity

Inspired by human connections, Adebanjo Adedoja studies how to make life longer

By Paul Massari | Photographs by Kathleen Dooher

Working late in the lab of Harvard Medical School (HMS) Professor Alex Soukas at Massachusetts General Hospital, the molecular biologist Adebanjo Adedoja befriended one of the custodial staff who came through to clean up every night. The man, a migrant from Guatemala, wasn't fluent in English. Having grown up in Lagos, Nigeria, Adedoja spoke no Spanish. Yet the two found ways to communicate, joking around and sharing a deeply human connection.

LUST FOR LIFE: Though much of his research focuses on the cells of tiny organisms, Adedoja's research is motivated by his love for humanity and passion for one of its great concerns: how to live a longer, healthier life.

One day, the custodian arrived with a surprising question: "What is cancer?" Adedoja did his best to distill the basics: DNA, genetics, uncontrolled cell division. "Can it happen to people who don't smoke?" Yes, Adedoja said. We can do everything right for our health, but sometimes things in our bodies just go wrong. The custodian nodded. It wasn't until months later that he finally pulled Adedoja aside to confide in him: His wife had the disease.

Four months later, the man's wife died in hospice. In the weeks afterward, Adedoja spoke often with his friend on the phone. He brought food. He sat with him quietly, met his kids, and learned so much about his friend's wife that Adedoja felt he knew her. In doing so, he came to understand at a deeper level the importance of his PhD work. "It reminded me that science doesn't end in the lab," he says. "It's not just down to studying cells and designing adequately controlled experiments. There's a whole humanity behind the research that we do. We have to keep that in mind and connect with people in that way."

A May 2025 graduate of Harvard Griffin GSAS with a PhD in biological and biomedical sciences, Adebanjo Adedoja's connection with people is always top of mind. Though much of his research focuses on the cells of tiny organisms, his friend's loss reminds him that it bears on one of humanity's great concerns: how to live a longer, healthier life.

Stressing Longevity

In the Soukas Lab, Adedoja studies mitochondria dysfunction in the context of aging. Often referred to as the "powerhouse" of a cell, mitochondria are organelles that produce adenosine triphosphate (ATP), the "fuel" burned to drive the functions of cells, organ systems, and, ultimately, whole organisms.

On the outer membrane of mitochondria sit voltage-dependent anion selective channels (VDACs). VDACs act a little like the holes in a colander or sieve, allowing metabolites and ATP to travel back and forth between mitochondria and the cytoplasm of a cell. Adedoja wanted to know how the workings of mitochondria—and, by extension, the lifespan of an organism—are impacted when the function of VDACs are disrupted. He thought the question was pretty straightforward.

"Famous last words," he laughs. "I'm trying to understand a very tiny part of a system that produces a lot of energy and is involved in several parts of cellular function."

To the extent that the problem had been studied in the past, the verdict was that the large-scale disruption of VDAC function would devastate an organism. "Work from as far back as 2006 shows that in mammalian cells, when VDACs are really high, it's bad, and when they're really low, it's bad."

To test this assumption, Adedoja worked with Caenorhabditis elegans (C. elegans), a tiny roundworm often used in biological research. Through RNA interference and also the use of CRISPR-Cas9 gene-editing technology, he reduced by fivefold the number of VDAC proteins functionally present on the worms' outer mitochondrial membrane—a huge decrease but not enough to kill the organisms. The result was . . . no difference in longevity compared to the control group.

Their offspring, however, were a different story.

"I took the progeny from those worms that already had reduced VDAC levels," Adedoja explains. "I collected their eggs,

> "It's not just down to studying cells and designing adequately controlled experiments. There's a whole humanity behind the research that we do. We have to keep that in mind and connect with people in that way." –ADEBANJO ADEDOJA

synchronized them with controls, and tracked the second generation. That's when I saw the phenotype."

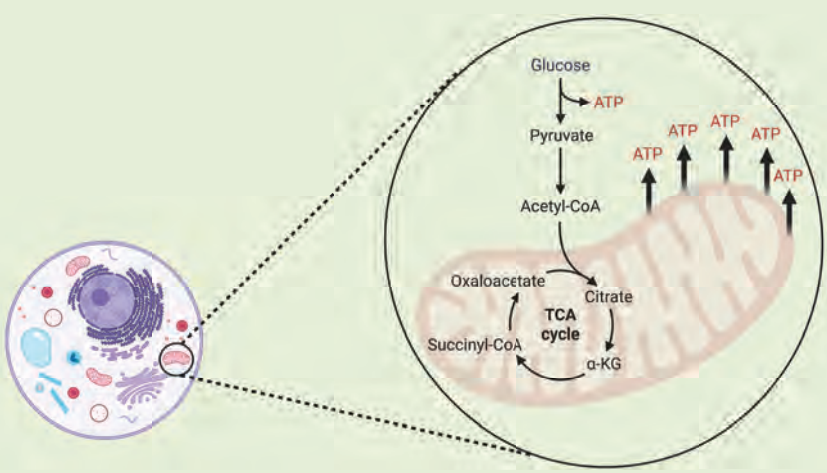
C. elegans usually have a lifespan of about three weeks. But, across three different replicates, Adedoja observed that the progeny of worms that had undergone VDAC disruption lived on average about 30 percent longer than those in the control group. The results were so startling that Adedoja had a hard time believing they were correct. "I repeated the experiment again and again, thinking 'Well, maybe I haven't mastered the counting technique yet. Maybe it was just a fluke and another replicate will completely disprove my results.' But when they were confirmed after the fourth, fifth, and sixth experiment, I started to think, 'Maybe I'm running out of excuses here. This is actually happening.'"

Adedoja says that the longer lifespan is a product of the mitochondrial stress response. "In some cases, when the conserved mitochondrial stress pathway is activated in C. elegans, it has some beneficial effects that show up as increased lifespan," he says. "The worms live longer. I was able to tie VDAC reduction to this stress response. In the end, I identified three new potential regulators of the stress response pathway that not only applied to stress from reduced VDAC but also to other genetic or chemical causes of mitochondrial stress. These regulators are conserved in humans, too."

Professor Soukas, Adedoja's PhD advisor, says that scientists have known for decades that mild disturbances in mitochondrial function trigger healthy stress defenses, promoting longevity and healthy aging. Inducing mitochondrial stress has been proposed as an approach to treating various mitochondrial, neurodegenerative, cardiac diseases, and cancer. But, Soukas says, there are still important aspects of mitochondrial stress defenses that remain uncovered. "Banjo identified an entirely new set of genes and molecules that are absolutely required for activating stress defenses and, correspondingly, for promoting lifespan extension in response to mild mitochondrial stress."

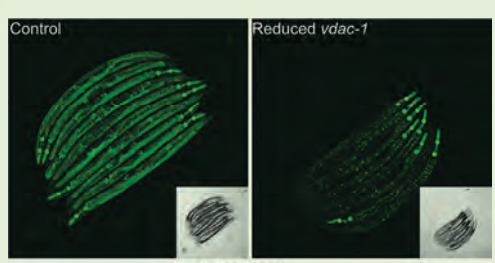
Adedoja's new data provides a way to activate some of the downstream health benefits of mitochondrial stress without disrupting the mitochondria—a potential first step in identifying new ways of reducing age-related diseases including Parkinson's, Alzheimer's, heart disease, and cancer. "We are presently unable to activate these favorable defenses, because humans can't tolerate disruption of mitochondrial function," Soukas says. "Banjo's work provides a new way for us to design strategies to promote healthy aging, bypassing the need to disrupt the mitochondria themselves. It's exciting to think that we could target dozens or even hundreds of age-related conditions by the discoveries made during his doctoral studies."

Shedding Light on Longevity



ABOVE: Often referred to as the "powerhouse" of a cell, mitochondria are organelles that produce adenosine triphosphate (ATP), the "fuel" burned to drive the functions of cells, organ systems, and, ultimately, whole organisms.

BELOW: Adedoja tagged voltage-dependent anion-selective channels (VDACs) in C. elegans worms with green fluorescent protein to show reduced levels after RNA interference. Across three different replicates, Adedoja observed that the progeny of worms that had undergone VDAC disruption lived on average about 30 percent longer than those in the control group.



INFOGRAPHICS: SOUKAS LAB (MITOCHONDRIA), CREATED BY ADOBANJO ADEDOJA USING BIORENDER (VDACS)

> **Banjo identified an entirely new set of genes** and molecules that are absolutely required for activating stress defenses and, correspondingly, for promoting lifespan extension in response to mild mitochondrial stress." –PROFESSOR ALEXANDER SOUKAS

Nursing an Interest in Science

Adedoja credits his interest in biology to his mother, a nurse—or at least to her books. Growing up in Nigeria, he would often page curiously through her nursing school texts in between—and sometimes instead of—doing his chores. He was particularly drawn to one titled, *Where There Is No Doctor*.

"It's basically just home remedies and things that you can do to treat patients when the nearest medical facility is one or two hours away," he says. "It's geared toward African countries, and there's information about everything from childbirth to diarrhea. I thought it was the most interesting thing. 'Here's how to make an electrolyte solution,' or 'If you see this symptom, don't even bother trying to do anything at home. Go to the hospital.'"

Adedoja found the subtext of the book as compelling as the science. "It was the fact that people didn't have access to care," he says. "I thought, 'Wow, that's insane. There are a lot of people around me who don't have access to all this.'"

The inequities in healthcare were on display in West Africa, where infectious disease was a major concern. "Malaria was something that most of us got," he says. "You might hear of people dying from it. "

The experience heightened Adedoja's interest in "these invisible tiny things that could be making us really sick." He originally planned to go to medical school but then realized his interest was more closely aligned with research in microbiology. "I wanted to learn about these microbes that were shaping the environment of the countries around me," he says.

After traveling to the US for a bachelor's and master's degree in biology at the University of Louisiana, Monroe, Adedoja enrolled at Harvard Griffin GSAS. He thought he might study the infectious diseases that had partially inspired his interest in science. After rotating through several labs, exploring topics of interest, however, he decided to venture into a new field and join the Soukas Lab to study the science of metabolism and healthy aging.

"It was hard," he says. "I had to learn a lot about metabolism, new experimental systems, and other things. The curve was very steep. But I did learn a lot at the end of six years, and I am grateful for what I got out of it."

It's also been hard to be so far from home for so long. "In 2015 I went back after graduating from college," he remembers. "My brother was graduating from high school, and there was a procession of graduating students. I found myself crying and thinking, 'What is this?' It was a sense of loss. I hold my siblings close to my heart and I had missed a significant chunk of my brother's life."

Showing Up for People

Adedoja's need to experience and foster closeness has translated to volunteer work in an impressive range of groups during his time at Harvard Griffin GSAS: the Biological and Biomedical Sciences Peer Mentor Program, Families for Depression Awareness, the Harvard Coalition for Black Lives, Skip the Small Talk, Community Cooks, and the Eighth Grade Science and Engineering Showcase. Now that he has graduated, Adedoja hopes to bring together his passions for science and for community by working in external relations for a healthcare- or science-related organization.

"The field of medical affairs and communications is top of the list for me, but I'm also interested in public affairs," he says. "Patient advocacy for health equity goes back to my early interests, the foundational ones that drew me to *Where There Is No Doctor*. I would like to be in a position where I can go back and forth between the spaces with my scientific expertise and also translating for the community where you need to focus on building relationships, credibility, and partnerships just by showing up for people and listening."

Wherever his academic and career journey leads, Adedoja says he will carry with him the desire to make life better for those everyday people like his Guatemalan friend and his late wife.

"That experience showed me that, no matter where I go in life, I should pay attention to the people who are in the background," he says. "It reminds me that there are always people who you may not see directly, who are not on the front lines doing the big, shiny stuff, but are just as important."

Foundational Leaders

THE 2025 CENTENNIAL MEDALISTS ESTABLISHED THE BASIS FOR NEW KNOWLEDGE AND NEW FIELDS OF STUDY. THEY INCLUDE A CO-FOUNDER OF PARTNERS IN HEALTH AND FORMER PRESIDENT OF THE WORLD BANK, AND A PARADIGM-SHIFTING EVOLUTIONARY GENETICIST WHOSE WORK INFORMS CRITERIA FOR EVALUATING EXTINCTION RISK. ALL OF THIS YEAR'S HONOREES ARE RENOWNED FOR BUILDING THE FOUNDATIONS OF THEIR DISCIPLINES.

BY KELLY HAHN | ILLUSTRATIONS BY MATT COOK

> “I think that it’s a myth that the humanities are in some way unsuited for collective scholarship. My experience, thanks to the possibilities afforded by the Institute, was exactly the opposite.”
>
> —*Lorraine Daston, Director Emerita, Max Planck Institute for the History of Science*

Lorraine Daston, PhD ’79, History of Science

LORRAINE DASTON, a leading historian of science and director emerita of the Max Planck Institute for the History of Science in Berlin, developed her passion for books as a child—just like her father, who grew up in the Roxbury neighborhood of Boston and was determined to read through the shelves of Boston Public Library “from A to Z,” by Daston’s account.

Daston experienced the same impulse when she arrived at Radcliffe College in 1969. “Should there be a heaven for scholars,” she says, “it is surely Harvard’s Widener Library,” home to a wealth of scholarship on astronomy, mathematics, physics, and the sciences, where Daston was destined to make her mark as a historian.

A first step on that journey came by way of Katharine Park, PhD ’81, Samuel Zemurray, Jr. and Doris Zemurray Stone Radcliffe Research Professor of the History of Science, emerita, who befriended Daston when they were both undergraduates at Radcliffe and recommended that she take Natural Sciences 9: “The Astronomical Perspective,” a legendary course taught by Harvard historian of science Owen Gingerich, PhD ’62.

“Raine has a gift for friendship,” says Park, “and—it’s not coincidental—a real commitment to collaborative work, to the idea that you get ultimately much farther working with people, particularly people whose fields are not necessarily congruent with your own. It’s one of the reasons Raine’s scholarship is so extraordinary: she’s brought people together and opened herself up to collaborations with people from very different fields.”

After completing her PhD in 1979 and teaching at Harvard, Princeton, Brandeis, the University of Göttingen, and the University of Chicago, Daston became one of the first directors of the Max Planck Institute. In that role, she built one of the world’s leading centers for the history of science from the ground up after the fall of the Berlin Wall and the end of the Cold War.

“I think that it’s a myth that the humanities are in some way unsuited for collective scholarship,” Daston observes. “My experience, thanks to the possibilities afforded by the Institute, was exactly the opposite. For me, the best way to think is in conversation with someone, and I’ve been lucky to have superb interlocutors.”

Daston’s distinguished body of work focuses on what she calls the “history of the self-evident”: concepts and ways of thinking—such as probability, objectivity, wonder, and rules—that we take for granted in everyday life. “What is thinkable?” Daston encourages us to ask. “What is unthinkable? Why is it that we have such difficulty imagining our way into different systems of thought, be they past or simply of different cultures?”

Understanding and analyzing these differences feels more urgent than ever, and Daston’s current projects reflect issues that loom large in global consciousness today. One project traces the history of the concept of natural disasters, which, Daston startlingly observes, recently drew to a close. “We have lost the category of a natural disaster for which no one is at fault,” Daston points out. “We do not believe human beings create Category 5 hurricanes, but we certainly believe that people fail to maintain dikes and levees to make proper preparations for the worst—and of course, in an age of global climate change, none of us are innocent of the disasters that have struck people all over the world.”

Her advice for students who dream of following in her footsteps? “Learn as many languages as you can,” Daston urges. “And go to Widener!”

Jim Yong Kim, PhD '93, Anthropology

FOR JIM YONG KIM—the first student in the history of Harvard's dual MD/PhD program to pursue a doctor of philosophy degree in the social sciences, who revolutionized global health care delivery when he co-founded Partners In Health with his classmate, the late Paul Farmer, PhD '90—graduate study in anthropology laid the groundwork for everything he would go on to do.

"I use my medical training not infrequently, but I use my anthropology training every day," Kim explains. "In anthropology, the task is understanding what it means to be human, and how cultural difference and social class shape what it means to be human in a particular place at a particular time. For me, it doesn't get better than that: to be able to contemplate these enormous issues with some of the smartest people you've ever met. Graduate school was one of the great periods of my life."

With Partners In Health, Kim and Farmer proved something previously unimaginable: that it is possible to move beyond disease prevention and bring state-of-the-art, life-saving treatment to some of the poorest areas of the world. Partners In Health tackled HIV/AIDS and drug-resistant tuberculosis (TB) in Haiti and Peru, success stories that paved the way for Kim's appointment as a director of the World Health Organization and his leadership of the "3 by 5" initiative, which set a goal to treat three million people in Africa for HIV/AIDS by 2005 and more than tripled access to antiretroviral medication on the continent.

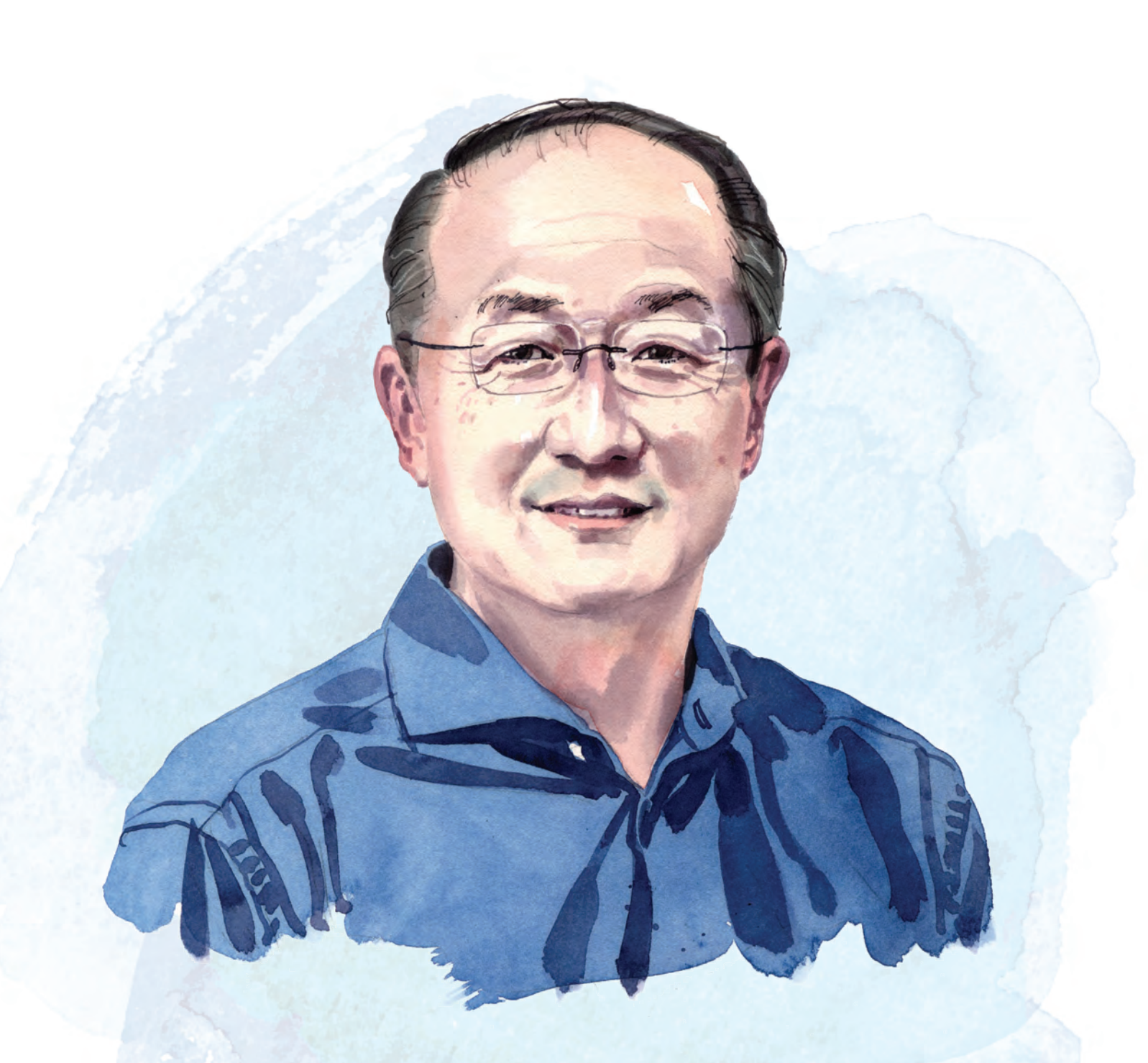
This was only the first of many dramatic transformations that Kim was destined to effect. In 2009, he became president of Dartmouth College, where he founded a new program in health care delivery science, a field now well represented across universities worldwide. Three years later, President Barack Obama nominated him to serve as president of the World Bank, where Kim set an ambitious goal for reducing global poverty, secured financing for climate change response, and emphasized mental health as a global priority.

Kim's work today includes serving as vice chairman of Global Infrastructure Partners, bringing private equity investment to critical infrastructure projects in developing countries, and as chancellor of the University of Global Health Equity in Rwanda, established in 2015 by Partners In Health, now ranked as one of the top four universities in sub-Saharan Africa.

"There's a rarity to Jim: a uniqueness, a singularity to his career," says Kim's MD/PhD advisor Arthur Kleinman, AM '74, Esther and Sidney Rabb Professor of Anthropology in the Faculty of Arts and Sciences and professor of medical anthropology in global health and social medicine and of psychiatry at Harvard Medical School. "He's moved between radically different institutions, and he's done transformative work at each place. He gets institutions to do things you would never, ever think they would do. He's an astonishing figure, and he's achieved at the highest level. He shows you what a leader is."

Kim encourages today's students to fully leverage the power of their education. "We were still trainees at Harvard when we took on enormous global issues like drug-resistant TB and HIV, and we gained so much strength from the fact that we were at Harvard," Kim observes. "We made the best possible use of our connectivity to the university to speak up on behalf of people who didn't have a voice. Anyone who has the good fortune of being a graduate student at Harvard should ask themselves, 'Given the ridiculously wonderful, elaborate nature of my education, what is my responsibility to the world?' Paul and I came up with one particular answer; everyone will have a different one."

> "In anthropology, the task is understanding what it means to shape what it means to be human in a particular place at a
>
> —*Jim Yong Kim, Co-Founder, Partners in Health*



be human, and how cultural difference and social class particular time. For me, it doesn't get better than that."

Russell Lande, PhD '76, Organismic and Evolutionary Biology

RUSSELL LANDE works on some of the biggest questions you can ask in science: How did we get here? How can we understand the complexity of life on Earth? And where are we going?

"From very early on, I always thought that evolution was one of the most fascinating subjects that humans could possibly consider," says Lande, an acclaimed population biologist and professor emeritus at the University of California, San Diego, and Imperial College London. As an undergraduate at the University of California, Irvine, Lande started out as an organic chemist but took classes for majors across a broad swath of disciplines—physics, chemistry, biology, math. After going on field trips with graduate students in deserts and mountains across Southern California, he turned his attention to theoretical ecology.

Lande spent a year in graduate school at the University of Chicago before making the move to Harvard with his adviser Richard Lewontin. Lande began studying evolution, and in the process, he connected the dots across different areas of science—and across time—in a way that would revolutionize the field.

The story stretches back to the early twentieth century, when the work of Gregor Mendel was rediscovered after languishing in obscurity for decades, leading to intense debates about the mechanisms driving genetic inheritance. These debates were resolved by the development of quantitative genetics—which enabled the statistical analysis of genetic variation—as well as modern statistics itself, now ubiquitous across the sciences and social sciences but invented first and foremost to answer these questions about genetics and evolution.

Remarkably, in the decades that followed, these insights were largely forgotten in academic circles. "After learning about the existence of quantitative genetics, I realized fairly quickly that nobody in ecology or evolution, broadly speaking, knew the first thing about it," Lande explains. This put him on a path to establish new foundations for the field, including a landmark paper in 1983 with S.J. Arnold on continuously varying "correlated characters": traits, like height and weight, that are influenced by many genes and a wide variety of environmental factors.

"This was a major advance in the field and got people thinking about correlated characters and evolution in a completely different way," says John Wakeley, professor of organismic and evolutionary biology. "It spawned subfields of evolutionary thinking that would not have happened otherwise."

Lande has had a similarly powerful influence on high-stakes environmental conservation efforts. His work serves as the basis for the International Union for Conservation of Nature's Red List Criteria for extinction risk, and he has provided expert testimony on the importance of land conservation and biodiversity—leading, most famously, to the protection of the northern spotted owl in the Pacific Northwest in the late 1980s.

"As a student, I was interested originally in the stability of ecological systems in the face of human perturbation, because it was pretty clear even then that the human population was on course to destroy the planet, its environment, and its own civilization," he says. "We are now in one of the great waves of mass extinctions in Earth's history, and very little is being done to stop it."

Lande offers a stark reminder: "Certain things can't be compromised, or else they just disappear," he observes. "You cannot keep compromising."

> "After learning about the existence of quantitative genetics, I broadly speaking, knew the first thing about it."
>
> *—Russell Lande, Professor Emeritus at the University of California, San Diego, and Imperial College London*

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Mary Beth Norton, PhD '69, History

HISTORIAN MARY BETH NORTON has been blazing unexpected trails her entire career. A former president of the American Historical Association and the first woman to be appointed to the history faculty at Cornell University, where she taught for 47 years, she played a leading role in establishing the field of colonial American women's history—but she began her journey as a historian with neither women nor colonial America in mind.

"As an undergraduate at the University of Michigan," Norton says, "I thought the colonial period was the couple of weeks you got through before you got to the interesting stuff in the nineteenth century." But in her second semester of graduate school at Harvard, she had what she calls a "conversion experience" in a seminar on colonial America. "There was something about that material that just grabbed me," Norton reflects. "The people of the mid-eighteenth century in Boston reached out to me over the years and said, 'Why didn't you ever pay any attention to us before?'"

Norton's dissertation, on Loyalists who fled America for England during the Revolution, won the Society of American Historians prize for the best dissertation on American history that year. "When I did my dissertation, I wasn't very interested in women," Norton says, "but because the Loyalists that I worked on had gone to England and had female relatives in America, I read a lot of letters from women."

This put her in a perfect position to notice statements that rang false about colonial women in early scholarship on American women's history, a field that began to emerge shortly after she completed her PhD in 1969. "The first articles focused on the early 19th century, and the authors made assumptions about women in the 18th century that I thought were incorrect," Norton explains. By painstakingly reviewing archival materials from the period, she was able to set the story straight, producing scholarship that defined the fledgling field, including *Liberty's Daughters* in 1980; *Founding Mothers and Fathers*, a finalist for the Pulitzer Prize, in 1996; and *Separated by Their Sex* in 2011.

"What most impresses me about Mary Beth Norton—other than her relentless energy and enthusiasm—is her capacity to pioneer new topics and give new life to old ones," says Laurel Thatcher Ulrich, 300th Anniversary University Professor, emerita. "She was first out of the gate in the 1970s and 1980s with her books on Loyalists and on women in the American Revolution. But she also surprised lots of people by taking on a topic that had been pioneered by others—New England witch-hunting—and saying something new."

Norton won the Ambassador Book Award in American Studies for her 2002 book on Salem, *In the Devil's Snare*. "I thought I was going to write a feminist reinterpretation of the witch trials," Norton says. The project changed direction when she realized, through close examination of the chronology, trial records, and published and unpublished materials about Maine in the 1680s and 1690s, that key players had experienced trauma in recent Indian wars: a neglected yet essential lens for understanding the crisis.

To aspiring historians who want to blaze new trails, Norton says, "Keep an open mind about sources. Keep an open mind about taking on projects. Keep an open mind about what the possibilities are." "It's only when we check our own assumptions and really listen that the voices of the past can speak to us authentically."

> "Mary Beth Norton was first out of the gate in the 1970s and American Revolution. But she also surprised lots of people
>
> *—Laurel Thatcher Ulrich, 300th Anniversary University Professor, Emerita, Harvard University*

1980s with her books on Loyalists and on women in the
by taking on a topic that had been pioneered by others."

RESHAPING THE FUTURE OF NEUROSCIENCE AND ANESTHESIOLOGY

Emery N. Brown, PhD '88, statistics, was awarded the National Medal of Science and Technology in a ceremony at the White House on January 3, 2025. Recognized for his groundbreaking contributions at the intersection of neuroscience, anesthesia, and statistical analysis, Brown has developed advanced algorithms that allow anesthesiologists to tailor treatment plans based on predictive models. "By looking at the patterns in an electroencephalogram, an anesthesiologist can modulate the dosage of a patient's drugs," Brown explains. This allows clinicians to "find the amount of anesthesia that someone can best tolerate while remaining unconscious to the painful stimuli of surgery," particularly in vulnerable populations such as older patients. Brown's work is also notable for its broader impact on neuroscience. By using anesthesia as a window into the brain's complex workings, Brown provides new insights into how it processes information, alters under anesthesia, and safely returns to consciousness.

Read more about Brown's work and the award at *gsas.harvard.edu/news/alumnus-receives-national-science-and-technology-medal.*

PHOTOGRAPH: THE NATIONAL SCIENCE AND TECHNOLOGY MEDALS FOUNDATION

Jacob Brown, PhD '22, social policy, last spring was named a 2025 Andrew Carnegie Fellow by the Carnegie Corporation of New York. Brown's research focuses on how patterns of residential living influence politics.

Nicholas Hutzler, PhD '14, physics, was honored in January with the Presidential Early Career Award for Scientists and Engineers. Hutzler was recognized for work that may help solve the question of what happened to all the antimatter in our universe.

Si Ying Lee, PhD '22, mathematics, was named one of three winners of the 2025 Maryam Mirzakhani New Frontiers Prize, awarded to outstanding women mathematicians who have recently completed their PhDs. Lee was recognized for her innovative approach to an important problem in the Langlands program.

Daniel Wolf Savin, PhD '94, physics, was named a fellow of the American Association for the Advancement of Science, one of the world's largest general scientific societies. Savin was recognized "for distinguished contributions to the fields of laboratory astrophysics, solar physics, and atomic physics."

Sandip Sukhtankar, PhD '09, political economy & government, was part of team of three researchers that received the 2025 International Partnership Award from the American Political Science Association. The award recognized their experimental evaluation of reforms to improve police responsiveness to women in India.

Srishti Gupta, AM '97, molecular & cellular biology, was appointed chief executive officer of Indorsia, a biopharmaceutical company headquartered near Basel, Switzerland. A physician and seasoned leader in global health and biopharmaceutical innovation, Gupta assumed her new role on July 1, 2025.

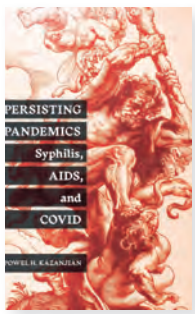
Cammi Valdez, PhD '14, biological chemistry and molecular pharmacology, in January was named a recipient of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. The award honors the vital role that America's teachers and mentors play in shaping the next generation of technical leaders.

Sonia Vallabh, and husband **Eric Vallabh Minikel**, both PhD '19, biological and biomedical sciences, were among a team of researchers who developed promising gene-editing therapy for prion disease, a rare, fatal condition. Vallabh has tested positive for an inherited form of the disease called fatal familial insomnia.

PHOTOGRAPHERS: COURTESY OF CAPS (BROWN), COURTESY OF CALTECH (HUTZLER), BREAKTHROUGH PRIZE (LEE), COURTESY OF DANIEL WOLF SAVIN, AJIT BHADORIYA (SUKHTANKAR), COURTESY OF SRISHTI GUPTA, COURTESY OF CAMMI VALDEZ, VEASEY CONWAY (VALLABH AND MINIKEL)

AUTHOR PROFILE

WHY PANDEMICS DON'T END



Powel Kazanjian, AM '02, is a professor of history and internal medicine (infectious diseases) at the University of Michigan and the author of Persisting Pandemics. *In the book, he draws on his training in both medicine and the humanities to explore why diseases like syphilis, AIDS, and COVID-19 continue to afflict populations despite major biomedical advances. Kazanjian argues that public health efforts fall short when they fail to address the persistent social, political, and economic inequalities that shape how pandemics unfold and endure.*

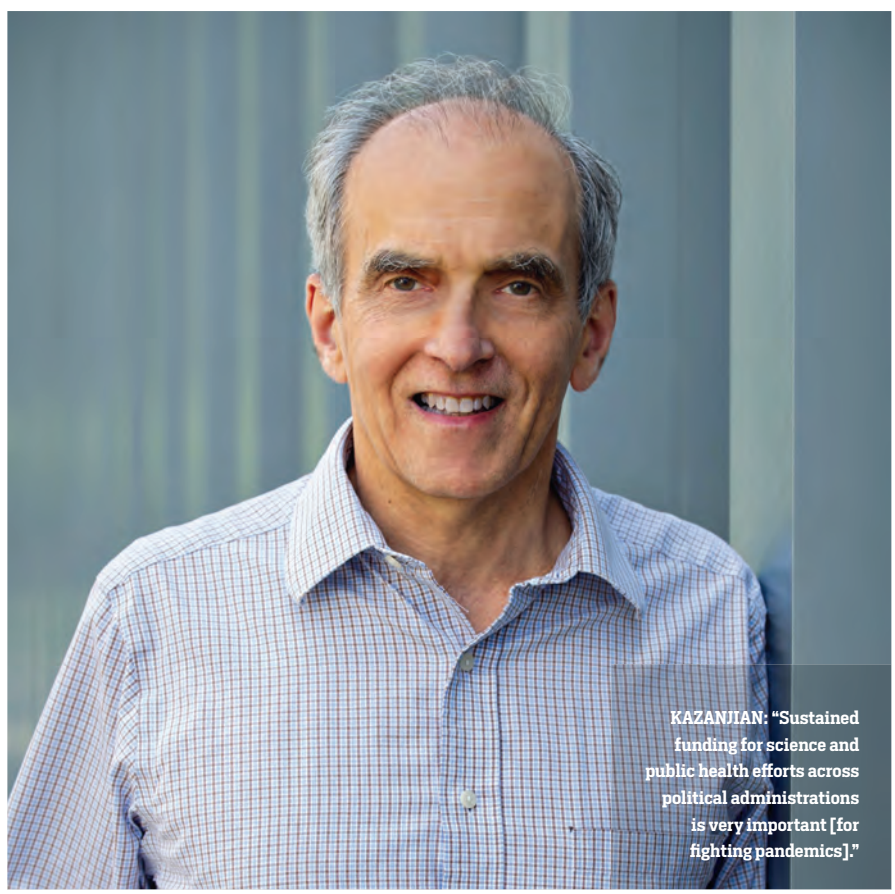
You begin your book with the myth of the Greek hero Herakles fighting the nine-headed Hydra, cutting off a head only to see two more sprout up in place. Is humanity's fight against infectious disease that futile?

I chose the Hydra because the way that the pandemics persist or recur are different than when they first start. Either the pathogens become resistant or there's some new issue, like problems with trust in science. These new aspects change the task at hand of eliminating the epidemic that has changed after you first tried to solve it.

Is it really futile to think you can end these epidemics? I think that you can come close to ending some of them. Very few of them have indeed ended, like smallpox. But most often, an epidemic persists, often along socioeconomic divides and in a different sort of capacity. For instance, most people now consider COVID a thing of the past, no longer a problem. But it still kills over 2,000 people a month around the world and can cause severe disease in the elderly or infirm.

You write in the book about the syphilis and AIDS epidemics. For readers who didn't live through them, what was the impact of these diseases—and of the scientific advances that made them treatable?

Before treatment was available in the 20th century, syphilis was a significant cause of disability and deformity: blindness, strokes, loss of memory, things that aren't seen that often anymore. Similarly, AIDS almost always progressed to death within three years after diagnosis. They were terrible deaths where people would walk around appearing emaciated and withdrawn. And these were people in the prime of their lives who had productive roles in society as wage earners for families or workers in factories or agriculture and or schools. The impacts of these epidemics went way beyond the individual. They impacted families, communities, educa-



KAZANJIAN: "Sustained funding for science and public health efforts across political administrations is very important [for fighting pandemics]."

PHOTOGRAPH: UNIVERSITY OF MICHIGAN DEPARTMENT OF HISTORY

tion, and nations. Developing countries became weaker because of the loss of economic productivity and of troops able to serve in the military.

Syphilis became treatable early in the 19th century, but particularly so in the 1940s, with the advent of penicillin, a safer drug that was a one-shot cure. The emergence of anti-retrovirals in the 1990s as a treatment for AIDS was seen as almost a miracle. They not only prevented death but also restored people to health. People looked at these drugs euphorically: "We're going to cure the individual and eliminate the disease from in the population."

You note that despite scientific breakthroughs, these diseases continue to persist. To what extent and why?

I've already mentioned COVID. There are presently about eight million new cases a year globally of syphilis. There are 39 million people worldwide living with AIDS, which still kills about 630,000 a year.

One factor is poverty. It can force, for instance, women into commercial sexual activities where they lack the authority to negotiate for condom use, in situations where they get more money if they have condomless sex. Social factors are also important. People can be afraid to be tested still, particularly in conservative societies where they feel they'll be discriminated against. When they do test positive, some are reluctant to reveal the names of their partners. Government neglect plays a role, by not consistently prioritizing funding for elimination programs and cutting funding for programs like USAID (United States Agency for International Development). And there's public mistrust of medical science. That came through the loudest with COVID. We never were able to reach the necessary amount of vaccine uptake because of this mistrust, which also extended to behaviors like social distancing and masking up.

So, what's the way out? How can societies combine science with social policy to fight persistent pandemics?

Medical science today is unmatched in terms of treating pathogens, restoring health. But to stop disease, you have to do more than that. It's important to address longstanding social, economic, and political problems with structural solutions. These include programs to reduce the shame of having a disease so that we can increase the number of people being tested. We're not going to "solve" poverty, but things like cash transfers could provide sex workers with the capital to invest in less risky businesses. Peer education could also empower them to negotiate for condoms in their work. And we need to resist anti-science appointees in government, as well as the implementation of regressive public health measures, and cutbacks. Sustained funding for science and public health efforts across political administrations is very important.

Finally, there needs to be a change at the individual level. We often think first about how wearing a mask or avoiding crowds interferes with our liberties and our enjoyments, rather than how they protect our society from harm. I think that mindset needs to be interrogated in both conservative and liberal societies.

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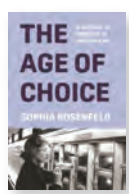

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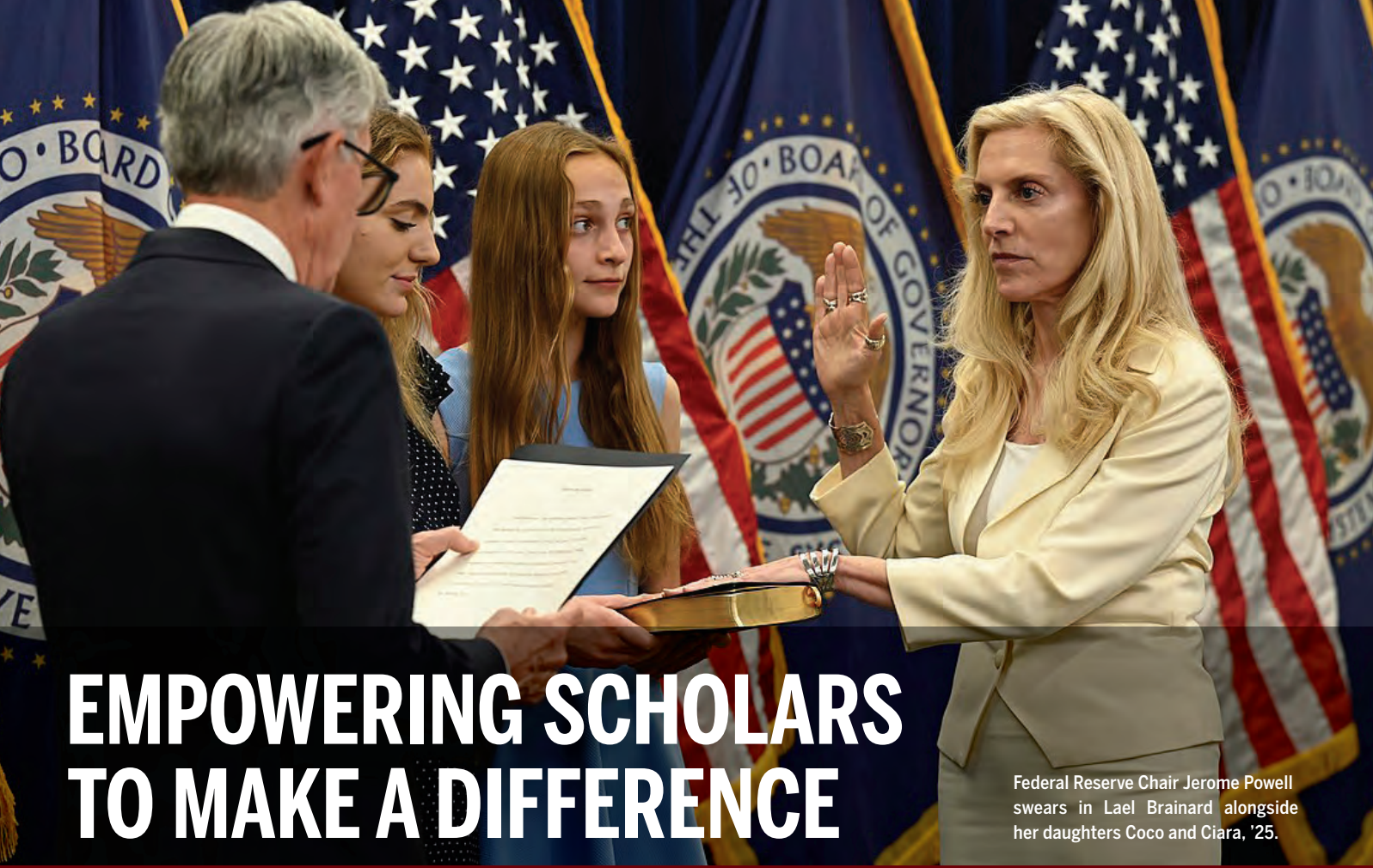

EMPOWERING SCHOLARS TO MAKE A DIFFERENCE

Federal Reserve Chair Jerome Powell swears in Lael Brainard alongside her daughters Coco and Ciara, '25.

PHOTO COURTESY OF LAEL BRAINARD

"Coming to Harvard was a real leap of faith," says Lael Brainard, PhD '89.

Today, Brainard, former vice chair of the Federal Reserve and National Economic Council director, and her husband, Kurt Campbell, a former Harvard Kennedy School professor, give to the Graduate School Fund because they want to ensure that today's graduate students can make their own impact on the world.

At Harvard, she found a tight-knit network of scholars and professors who dug into the rigorous curriculum of testing theories and applying data but also cared deeply about the real-world applications of their work. "Like me, they were interested in economics as a powerful framework for effecting change in the world," says Brainard.

Thanks to fellowship and grant funding, Brainard was able to follow her passion without taking on debt. "Because of the strong support I received from Harvard, I was able to earn my PhD in a way that left me financially unencumbered," she shares. "I'm very grateful for that and I want other students to have that same opportunity."

Brainard is hopeful that those who want to follow in her footsteps will consider a degree in the arts and sciences. "I hope that more smart, motivated people who want to make a difference will see the Harvard Griffin GSAS as a way of getting the skills and experience they need to do just that," she says.

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