



# PULSE

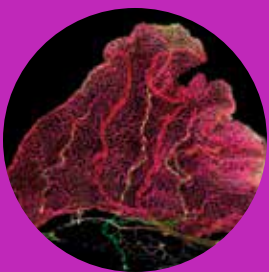
FALL 21

FEATURED STORY

## MAKING A PROFOUND MARK ON HUMAN HEALTH

The Berkowitz family propels precision medicine research by bringing together HMS and Israeli scientists

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# TOWARD BETTER MEDICINE

Gift will propel precision medicine research and training at HMS, Clalit Research Institute

➔ Why does SARS-CoV-2 shapeshift wildly from one person to the next, causing barely a sniffle in some but raging, lethal infections in others? Why do people diagnosed with the same cancer and receiving identical treatments have vastly different outcomes?

Untangling the precise factors that underlie such medical mysteries can illuminate individualized treatments based on a person's genetic predispositions, immune profile, health history, and lifestyle. Such insights can propel forward the science and practice of precision medicine and have a profound effect on human health.

Now, in a decisive step forward on this quest, Clalit Research Institute in Tel Aviv, Israel, and Harvard Medical School are launching a joint precision medicine effort, enabled by a donation from the Berkowitz family. The gift will establish The

Ivan and Francesca Berkowitz Family Living Laboratory Collaboration at Harvard Medical School and Clalit Research Institute.

The program will have two arms: The Ivan and Francesca Berkowitz Family Living Laboratory at HMS and The Ivan and Francesca Berkowitz Family Precision Medicine Clinic at Clalit. The two arms will work together to conduct joint research. The Clalit arm will also feature a clinical component that will provide diagnosis and care for patients with rare, undiagnosed, and hard-to-treat conditions.

"It is our hope that through this effort, we can harness the strength of both Harvard Medical School and Clalit in a way that will allow this collaboration to produce enormous benefits to both health and medical care globally," Ivan

Berkowitz says. "We are very happy to be one leg of this three-legged stool—the technology and medicine, the health care system, and, ultimately, the philanthropy, which makes it all happen."

The research arm of the initiative will focus on generating insights from data and translating them into frontline clinical interventions. Under its educational arm, it will train the next generation of biomedical informaticians and computational biologists. The work will be led jointly by Isaac Kohane, MD, PhD, the Marion V. Nelson Professor and chair of the Department of Biomedical Informatics (DBMI) in the Blavatnik Institute at HMS, and Ran Balicer, MD, PhD, MPH, founding director of the Clalit Research Institute and chief innovation officer of Clalit Health Services, Israel's largest health insurance and medical provider.

"This work, powered by the passion and vision of the Berkowitz family, is an example of cross-pollination across countries, across institutions, and across disciplines," says HMS Dean George Q. Daley, AB '82, MD '91, PhD. "The scientific and educational paths forged by this collaboration and the medical insights enabled by these efforts will ripple beyond borders and across generations."

Eli Cohen, acting CEO of Clalit Health Services, says: "A synergy exists between the aspiration for innovative insights and the desire to improve clinical care. The new initiative driven by the foresight of the Berkowitz family will achieve both aims in full alignment with Clalit's strategy to allow every patient personalized effective care, while achieving a profound effect on science and clinical care globally."

The collaboration will bring together—and amplify—each institution's traditional strengths. The DBMI is a powerhouse in the fields of data science, machine learning, and computational biomedicine. Clalit Research Institute is a global leader in translational science and innovation, applying Clalit Health Services' decades-long unique data repositories and Israel's top data-science talent to redesign and transform clinical care for the benefit of Clalit's 4.7 million members.

MAXWELL A. SHERMAN, A PHD STUDENT IN COMPUTER SCIENCE AT MIT, IS SEEN WORKING AS A SCIENTIFIC PROGRAMMER WITHIN THE HMS DEPARTMENT OF BIOMEDICAL INFORMATICS.



# TRAINING THE NEXT GENERATION OF LEADERS

## ➔ Harvard Medical School will share its expertise and knowledge with bioinformatics scientists in Israel through three scholarly exchanges:

- A cadre of postdoctoral trainees from Israel will be selected as Berkowitz Postdoctoral Fellows to receive training in research at HMS, guided by HMS faculty serving as research mentors and educators. These fellows will conduct part of their work at HMS and part of it at Clalit Research Institute, forging stronger training and research ties between the two institutions.
- A group of clinical researchers from Israel, chosen through a nationwide search, will attend a summer bootcamp in biomedical informatics at HMS. During this three-month program, these Berkowitz Scholars will study the latest precision medicine approaches and methods, with a focus on designing and leading their own clinical research projects upon returning to Israel.
- Select faculty members from HMS who are serving as mentors in the postdoctoral program will have the chance to work directly with Clalit researchers, with the option of serving in residence at Clalit.

## PRECISION MEDICINE TAILORS TREATMENTS BASED ON DIFFERENCES IN PEOPLE'S DNA, ENVIRONMENTS, AND LIFESTYLES.

Under the agreement, Clalit will set up Israel's first precision medicine clinic dedicated to identifying tailored therapies for patients in whom no standard treatment has proven effective. The clinic will also work to untangle medical mysteries in patients with undiagnosed diseases—an approach modeled after the U.S. Undiagnosed Diseases Network, for which HMS is a national coordinating center led by Kohane.

While the most immediate impact of the clinic's work will be for patients in Israel, the long-range goal is to yield insights and fuel therapies that benefit people across the globe.

### Precision medicine's promise

Precision medicine has been described as care that takes into account individual variability to inform the most individualized treatment for each patient. New insights into human biology, genetics, genomics, big-data science, clinical medicine, and computation have brought precision medicine ever closer to reality. For example, scientific advances in the past 20 years have transformed the treatment of several types of cancers and led to the design of targeted therapies based on individualized genomic profiles for lung cancer, breast cancer, and melanoma.

These successes in cancer therapy offer a potent illustration of the promise of precision medicine, but other conditions are also ripe for similar study and targeted approaches—metabolic disorders such as Type 2 diabetes, various forms of cardiovascular illness, and immune diseases, including autoimmune conditions such as rheumatoid arthritis and Type 1 diabetes.

The promise of precision medicine goes beyond the ability to forecast how patients would respond to given treatments based on their genomic profiles and choosing the best targeted medication

accordingly. Done right, precision medicine could enable tailored predictions of disease well into the future, long before it manifests clinically.

“The many synergies of this collaboration will allow us to realize the vision of precision medicine and move toward a future of predictive medicine, where the power to anticipate medical risk can prevent people from getting sick in the first place,” says Ben Reis, PhD, assistant professor of pediatrics at Boston Children's Hospital (BCH), affiliate faculty member in the DBMI, and director of the Predictive Medicine Group at the BCH Computational Health Informatics Program. “The Berkowitzes' generous gift creates profound opportunities both for Harvard and our partners at Clalit. We look forward to realizing the enormous potential of this transformational opportunity for the benefit of patients worldwide.”

**“THE SCIENTIFIC AND EDUCATIONAL PATHS FORGED BY THIS PARTNERSHIP AND THE MEDICAL INSIGHTS ENABLED BY THESE EFFORTS WILL RIPPLE BEYOND BORDERS AND ACROSS GENERATIONS.”**

GEORGE Q. DALEY

### Lab to clinic and beyond

Researchers at Clalit's Precision Medicine Research Clinic will work side by side with scientists at the Living Laboratory in the DBMI at HMS. Real-life data from millions of patients

accumulated over decades, when analyzed in aggregate, can provide invaluable insights about the real-time behavior of a disease, but it could yield deeper answers as well.

“Such insights can beget further ones by compelling researchers to ask questions about the origins of disease—the fundamental mechanisms that give rise to dysfunction,” says Shay Ben-Shachar, director of precision medicine and genomics at Clalit Research Institute. “This is the true long-term value of this effort.”

The idea that gleaning insights from a single patient or a handful of patient cases could be amplified and propagated to help countless others captivated the imagination of Adam Berkowitz, son of Ivan and Francesca, and the youngest of three children.

“This is an opportunity to extract knowledge from very specific cases and generalize these insights to help people in Israel and around the world, and all we need is one of those insights to power a general extract,” Adam Berkowitz says. “That's the beauty and the true power of data. The fact that with a single insight you could potentially help millions.” The vision and excitement are echoed by Adam's siblings, Elizabeth Lewinsohn and Eric Berkowitz. “The rewards of this innovative collaboration for global health care could be immense,” Lewinsohn says.

Eric Berkowitz, the oldest of the three, says, “Through data-driven insights, this historic collaboration will lead to new knowledge, novel treatments and cures, and, ultimately, to a better quality of life.”



# DEDICATED TO INNOVATION ON BEHALF OF PATIENTS

➔ “Do big.” That’s one of Sage Therapeutics’ five core values. This year, the company definitely went big, giving \$300,000 to Harvard Medical School to support fellows conducting neuroscience-related research within the Harvard-MIT Center for Regulatory Science (CRS).

At Sage, “doing big” means, among other things, thinking beyond boundaries, challenging conventional wisdom, and collaborating and fostering innovation. These principles align nicely with those of the CRS fellowship program, which engages people who are passionate about developing novel approaches in regulatory science to improve medical product development. In making this gift, Sage is following through on its goal to support organizations that demonstrate the highest standards of excellence and share its commitment to innovation on behalf of patients.

Jeff Jonas, MD ’79, is the chief innovation officer of Sage, which focuses on developing a portfolio of drug candidates for brain health disorders. He says that innovation in the discovery and development of brain health drugs has lagged behind compared to other therapeutic areas. “We believe HMS and this program are uniquely suited to systematically evaluate new regulatory and development pathways to approach this issue,” he says. “We are excited to fund this important initiative.”

**“WE ARE HOPEFUL THAT, WITH SAGE’S SUPPORT OF OUR TALENTED FELLOWS, WE CAN SPEED UP THE PROCESS OF BRINGING BETTER, SAFER DRUGS TO THE PATIENTS WHO NEED THEM.”**

FLORENCE BOURGEOIS

Florence Bourgeois, MD, MPH ’05, associate professor of pediatrics at Boston Children’s Hospital and co-director of the Center for Regulatory Science, says: “Improving patient health outcomes is the ultimate driver of the work in the Center, and we need like-minded partners to help propel us forward on this mission. Thankfully, we have found one in Sage. We are hopeful that, with Sage’s support of our talented fellows, we can speed up the process of bringing better, safer drugs to the patients who need them.”



**TO LEARN MORE ABOUT THE CRS FELLOWSHIP PROGRAM—ITS OBJECTIVES AND APPLICATION PROCESS—VISIT [HMCRCS.ORG/FELLOWSHIP/OVERVIEW](https://hmcrcs.org/fellowship/overview).**

## MAHONEY PRIZE WINNER ADVOCATES FOR MENTAL HEALTH CARE

➔ The Harvard Mahoney Neuroscience Institute (HMNI) and Harvard Medical School celebrated the 2020 David Mahoney Prize winner, Elyn Saks, JD, PhD (bottom), at an April virtual symposium titled “Profile in Mental Health and Courage.” Saks received the prize—awarded to people who have significantly increased public awareness about brain science and disorders of the nervous system—for her efforts to reduce the stigma of psychiatric disease, advocate for patients and families, and improve policy and treatment for individuals with brain disease.

Saks is the associate dean of the University of Southern California Gould Law School, where she is also the Orrin B. Evans Professor of Law, Psychology, and Psychiatry and the Behavioral Sciences. Her memoir, “The Center Cannot Hold: My Journey Through Madness,” describes her personal struggles with schizophrenia and how

she managed a successful academic career in the face of this prognosis.

“Coming forward and telling my story took some courage,” Saks said at the symposium. “A friend of mine cautioned me against doing the book under my own name.” The friend suggested that Saks use a pseudonym to avoid becoming known as “the schizophrenic with a job.” But Saks decided that using a fictitious name would send the wrong message. “And my friend, in retrospect, said I was right.”

Anne Hallward, AB ’88, MD ’97 (top), host and founder of Safe Space Radio, served as moderator of the symposium, which also featured HMS Dean George Q. Daley, AB ’82, MD ’91, PhD; Michael E. Greenberg, PhD, the Nathan Marsh Pusey Professor and chair of the Department of Neurobiology in the Blavatnik Institute at HMS; and HMNI founder Hildegarde E. Mahoney.



**ELYN SAKS DISCUSSES HER STRUGGLES WITH SCHIZOPHRENIA AT [TINYURL.COM/HMNI-SYMPOSIUM](https://tinyurl.com/hmni-symposium).**

# BOOSTING HEALTH CARE IN TUNISIA

➔ Tunisia's four medical schools are now offering HMX online courses to select groups of their students, helping to equip these future physicians with the skills needed to provide outstanding care in North Africa's smallest country.

The four schools, situated in the major cities of Tunis, Sfax, Sousse, and Monastir, have made available all five of Harvard Medical School's HMX Fundamentals courses—biochemistry, genetics, immunology, pharmacology, and physiology. The students will acquire more in-depth knowledge of the basic sciences, which they can then apply to clinical practice.

**“I HOPE THIS INITIATIVE WILL HELP OPEN A SMALL DOOR FOR THE NEXT GENERATION OF TUNISIAN PHYSICIANS TO BE THE BEST THAT THEY CAN BE AND CONTRIBUTE TO ENHANCING HEALTH CARE IN TUNISIA.”**

HAZEM BEN-GACEM

“I am thrilled for this partnership between Harvard Medical School and the medical schools of my home country,” says Hazem Ben-Gacem, AB '92, who is funding the program with a \$1 million gift. “I hope this initiative will help open a small door for the next generation of Tunisian physicians to be the best that they can be and contribute to enhancing health care in Tunisia.”

In October 2019, Ben-Gacem provided funding for the deans of the Tunisian medical schools to attend HMS's inaugural IMPACT Symposium—a meeting to explore trends, developments, and current best practices in medical school education. The symposium created connections and generated conversations that led to the opportunity to expand the reach of HMX's unique online education.

“We are very grateful to Mr. Ben-Gacem for his generous commitment to informing and inspiring medical students who will make a lasting impact on patient care in Tunisia,” says David Roberts, MD '95, dean for external education at HMS and the Steven P. Simcox, Patrick A. Clifford, and James H. Higby Associate Professor of Medicine at Beth Israel Deaconess Medical Center.

Ben-Gacem, co-chief executive officer of Investcorp, has funded other key University initiatives, including the opening of the Tunisia Office of the Center for Middle Eastern Studies at Harvard University.



HMX courses are suitable for students who are considering or attending medical school, professionals looking to improve knowledge for work, and curious learners who want to know more.

AN ILLUSTRATOR HELPS BRING AN HMX COURSE TO LIFE.



LEARN MORE ABOUT HMX'S OFFERINGS BY VISITING [ONLINELEARNING.HMS.HARVARD.EDU/HMX](https://onlinelearning.hms.harvard.edu/hmx).

“Implementing HMX online courses will offer an excellent opportunity to Tunisia's medical students,” says Mohamed Jouini, dean of the Faculty of Medicine of Tunis at Tunis El Manar University. “We hope this first initiative will establish a fruitful and long-lasting relationship between the Faculty of Medicine of Tunis and Harvard Medical School. For our school, this project comes as a great addition to a wider strategy of international cooperation. We are putting every effort into making this experience a success, and we hope to see the opportunity extended to a larger number of students in the future,” he says.



# A STRONG VOICE FOR AGING RESEARCH

➔ The late Paul F. Glenn, JD '55 (pictured), a brilliant investor who parlayed his mastery of commodities markets into riches that have fueled leading-edge medical research, once belonged to a barbershop quartet that he formed with three of his law school classmates. They made an album together and performed throughout the Greater Boston area, four voices in harmony.

Today, within the Paul F. Glenn Center for Biology of Aging Research at Harvard Medical School, there exists a different kind of quartet, though its members work in harmony all the same, pursuing the common goal of extending the healthy years of a person's life. They are the leaders of the HMS center's four labs: David Sinclair, PhD, professor of genetics and co-director of the center; Bruce A. Yankner, MD, PhD, professor of genetics and neurology and co-director of the center; Marcia Haigis, PhD, professor of cell biology; and Amy Wagers, PhD, the Forst Family Professor of Stem Cell and Regenerative Biology at Harvard and co-chair of the Department of Stem Cell and Regenerative Biology.

Singing their praises is K. Leonard Judson, CEO of the Glenn Foundation for Medical Research, which Glenn established in 1965. The foundation began supporting HMS in 2005 and has given more than \$17 million to the School since then, including a recent \$1.6 million grant supporting the Glenn Center at HMS.

"In creating the Paul F. Glenn Centers, we have always expected that the sum of the collective laboratories and scientists would be more than the individual parts," says Judson. "This is true for both the individual centers and the cumulative network. The Glenn Center at HMS has been a great example of both. We have seen collaboration among principal investigators at Harvard that probably wouldn't have otherwise occurred, and they have reached out to form associations with scientists at other centers."

**"CONTINUED SUPPORT FROM THE GLENN FOUNDATION HAS LED TO NEW TECHNOLOGY AND NOVEL APPROACHES TO UNDERSTANDING AGING."**

BRUCE A. YANKNER

Glenn, a firsthand witness to the declining health of his aging grandparents, made it his mission to support research that might extend human health spans. Sadly, he died of pneumonia last year a month shy of celebrating his 90th birthday, but his financial support allowed the Glenn Foundation to establish aging-research centers at Harvard and eight other institutions.

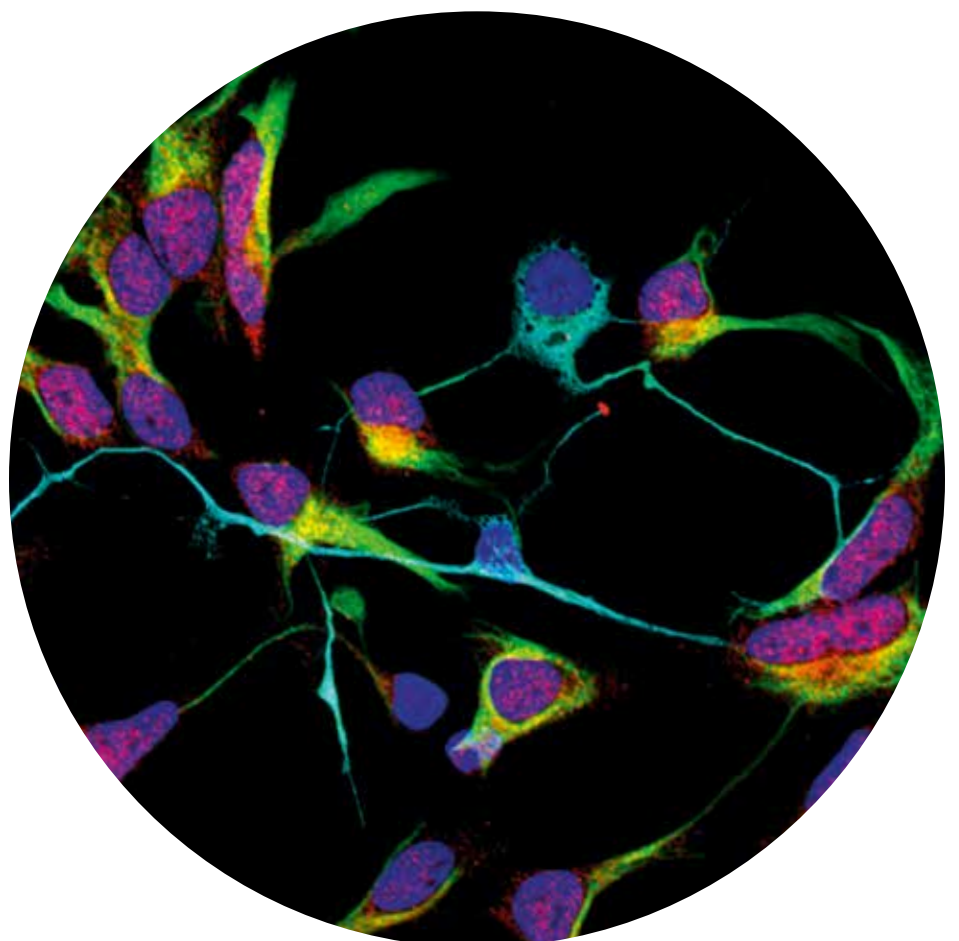
The mission of the Glenn Foundation for Medical Research is to extend the healthy years of life through research on mechanisms of biology that govern normal human aging and its related physiological decline, with the objective of translating research into interventions that will extend health span with life span.

The Glenn Foundation has funded more than \$100 million in basic research through these centers and other programmatic activities.

"Continued support from the Glenn Foundation has led to new technology and novel approaches to understanding aging, ranging from stem cell models to aging clocks to the preservation of cognitive function," says Yankner. "This cross-disciplinary effort would be difficult to sustain through traditional grant funding mechanisms. As such, the center plays a pivotal role in pushing the boundaries of aging biology and medicine at Harvard."

In a nod to Paul Glenn, Sinclair says, "We are so grateful for this new grant, which will allow us to continue to research why aging occurs and what we can do about it to improve human health in order to honor Mr. Glenn's legacy."

ALZHEIMER'S  
DISEASE NEURONS  
IMAGE: YANKNER LAB



# FACES OF HMS



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**01** HMS and the Harvard School of Dental Medicine held a virtual Class Day ceremony in May, during which 194 new doctors and dentists convened online to receive their degrees. Melody Huang, MD '21, celebrates in regalia at home.

**02** The four members of the inaugural cohort of the HealthTech Fellowship program—Sim Kahlon, MBA; Bahar Rahsepar, PhD; Harvey Chin, MD, MBI '20; and Manny Fanarjian, MD—celebrate their successful completion of the 10-month program during a virtual ceremony in May. Overseen by the HMS Center for Primary Care, the program is a collaborative effort among HMS, the Harvard John A. Paulson School of Engineering and Applied Sciences, and Harvard Business School that embeds participants at Harvard-affiliated hospitals with the goal of having the fellows identify and characterize unmet health care needs through direct observation.

**03** Katrina A. Armstrong, MD, MSCE, delivers the Class of 1958 Commemorative Lecture in May via Zoom. Classmates established the annual lecture in honor of their 50th Reunion as a gift to the graduating class to reinforce the idealism, humanism, and nobility of medicine. Armstrong is the Jackson Professor of Clinical Medicine at HMS and Massachusetts General Hospital, where she leads the Department of Medicine and serves as physician-in-chief.

**04** Two scientists within the Blavatnik Institute at HMS—Dragana Rogulja, PhD, associate professor of neurobiology, and Markus Basan, PhD, assistant professor of systems biology—are the latest recipients of two-year HMS Junior Faculty Grants from the Giovanni Armenise Harvard Foundation. The foundation prioritizes support of promising young scientists at HMS as an essential part of its mission. Recipients of these grants are nominated by HMS's basic science department leaders.

**05** Dan Barouch, AB '93, MD '99, encourages HMS's 144 master's graduates to "tackle hard problems," regardless of their chosen field, as he delivers the keynote speech at the School's virtual master's graduation ceremony in May. Barouch, the William Bosworth Castle Professor of Medicine at HMS and Beth Israel Deaconess Medical Center (BIDMC) and director of the Center for Virology and Vaccine Research at BIDMC, played a key role in the design of the Johnson & Johnson/Janssen coronavirus vaccine.

**06** Christopher A. Walsh, MD, PhD, the Bullard Professor of Pediatrics and Neurology at HMS and Boston Children's Hospital (BCH) and chief of the Division of Genetics and Genomics at BCH, delivers the virtual keynote speech—titled "Autism Genetics, Cognition, and Human Brain Evolution"—in May during the first public outreach lecture of the Hock E. Tan and K. Lisa Yang Center for Autism Research at HMS.

**07** Chukwuma Eruchalu, MD Class of 2021, was one of the more than 30 HMS students who presented their research projects at the 81st Soma Weiss Student Research Day in March. The annual event, which was held virtually, honors the memory of Soma Weiss, MD, an inspiring HMS teacher and physician and an ardent supporter of student research.

**08** The Harvard Mahoney Neuroscience Institute (HMNI) and HMS celebrated the work of the 2020-2021 HMNI Fellows—including Aditi Banerjee, PhD, who is focusing on the fundamental mechanisms of dopamine release in the midbrain, which malfunction in numerous human conditions—during the inaugural On the Brain Lecture, held virtually in May.



# SEED GRANT PROGRAM AIMS TO GROW BIPOLAR TREATMENT OPTIONS

➔ Bipolar disorder is characterized by extreme shifts of mood between mania and depression that can make managing daily life difficult for the 5.7 million Americans impacted by this disorder. Their best hope for limiting symptoms is lithium, a drug first discovered for bipolar treatment decades ago that comes with burdensome side effects. In hopes of spurring the development of new therapeutics, the Dauten Family Foundation has given \$9 million since 2015—including a recent \$3 million gift—to researchers through the Harvard Brain Science Initiative (HBI) to build foundational knowledge and improve the basic understanding of bipolar disorder.

**“THE DAUTENS’ SUPPORT HAS BEEN TRANSFORMATIVE FOR OUR COMMUNITY, CATALYZING MANY PROJECTS THAT SIMPLY WOULDN’T HAVE BEEN DONE WITHOUT THIS SORT OF FLEXIBLE AND DARING SUPPORT.”**

VENKATESH MURTHY

With the foundation’s support, approximately 10 scientists across Harvard’s undergraduate campus, medical school, and affiliated hospitals receive grants each year through the HBI Bipolar Disorder Seed Grant Program. The first six years of the program already enabled these researchers to make real progress in several areas. Notably, HBI researchers have made headway in disentangling the roles of different types of serotonergic and dopaminergic neurons in the brain. The existing treatments for symptoms of bipolar disorder are known to influence these cells, but the complexity of behavioral effects resulting from promoting or dampening one type of neurotransmitter signaling makes it challenging to understand the nuances of their role in the disease. Scientists also need more information and tools to study the specific roles of different subtypes of neurons.

Two labs in the Blavatnik Institute at HMS—one led by Susan Dymecki, MD, PhD, a professor of genetics, and the other by Bernardo Sabatini, BS ’91, MD ’99, PhD ’99, the Alice and Rodman W. Moorhead III Professor of Neurobiology—have developed advanced molecular and anatomical maps of the dorsal raphe nucleus, a complex structure with diverse groups of serotonergic neuron subtypes. The new knowledge gained is likely to help researchers better understand the functions of the different subtypes, determine which ones might be critical to target in bipolar disorder, and hopefully increase the specificity of any new therapeutic strategies.

The lab of Maria Lehtinen, PhD ’06, an associate professor of pathology at Boston Children’s Hospital, has been studying the choroid plexus (ChP), a mysterious and poorly understood tissue found in brain ventricles that produces most of our cerebrospinal fluid. Lehtinen’s team has observed that choroid plexus cells express serotonin receptors, but the ChP’s connection to serotonergic signaling in the brain is largely unknown. To explore the choroid plexus’s possible involvement in bipolar disorder, the team created imaging tools to understand the function of ChP cells in explants and awake mice. The lab is now examining how mood disorder drugs might impact the cells.

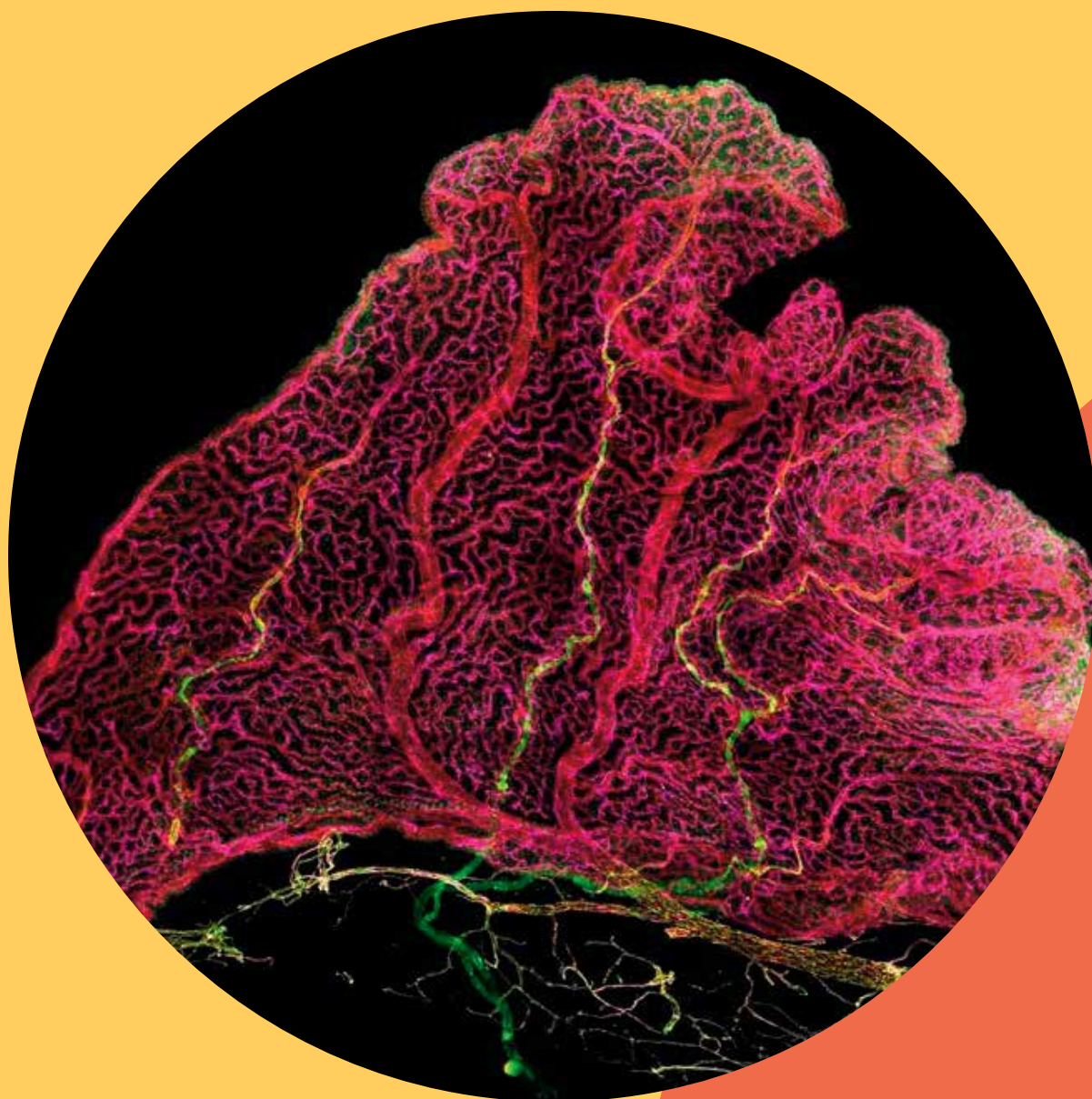
“We continue to be very impressed by the great projects being funded by the HBI Bipolar Disorder Seed Grant Program, and we are excited to see how ‘thinking outside of the box’ will further push the envelope on how we learn about, think about, talk about, and treat bipolar disorder,” the Dauten Family Foundation said in a statement. Kent Dauten, MBA ’79, and his wife, Liz, are somewhat expert on the disorder, having studied it extensively after two of their four children were diagnosed as teenagers.

The foundation’s latest gift extends the seed grant program for another three years. Of the 10 newest projects awarded funding this year, four will investigate the role of sleep, circadian rhythms, and seasonal changes in bipolar disorder, while others focus on immune-related treatment targets and the genetics of the disorder. (See a list of the newest projects at the bottom of the opposite page.)

“The Dautens’ support has been transformative for our community, catalyzing many projects that simply wouldn’t have been done without this sort of flexible and daring support,” says HBI co-director Venkatesh Murthy, PhD, the Raymond Leo Erikson Life Sciences Professor of Molecular and Cellular Biology and the Paul J. Finnegan Family Director of the Center for Brain Science at Harvard University.

**IMMUNOFLUORESCENCE IMAGING OF THE CHOROID PLEXUS, A BRAIN AREA WHOSE INVOLVEMENT IN PSYCHIATRIC CONDITIONS REMAINS MYSTERIOUS, SHOWS THE TISSUE IS INNERVATED BY A DIVERSE NETWORK OF ARTERIES AND CAPILLARIES.**

IMAGE: LEHTINEN LAB





# A BIG LIFT TO LONGEVITY RESEARCH

➔ Duane and Susan Hoff traveled to Rome in 2018 for the fourth International Vatican Conference, eager to hear leading decision-makers in medicine, business, media, advocacy, and faith discuss ways to improve human health, prevent disease, and protect the environment. They left Italy inspired, particularly by the scientists who described their efforts to extend health span—the healthy years of a person’s life—rather than just life span.

“Longevity and regenerative medicine are bold new fields,” says Duane Hoff. “The faster we can understand how certain genes affect aging and can be manipulated to sustain better health, the sooner we can hope for treatments for all of our loved ones.”

“AGING IS THE MAJOR FACTOR OF NOT JUST CANCER BUT OF MOST SUFFERING ON THE PLANET.”

DAVID SINCLAIR

To help speed up that process, the Hoffs, proprietors of Fantesca Estate & Winery in St. Helena, California, have established the Duane and Susan Hoff Fund for Longevity Research at Harvard Medical School. Their \$1.5 million gift supports David Sinclair, PhD (pictured), professor of genetics in the Blavatnik

Institute at HMS and co-director of the Paul F. Glenn Center for Biology of Aging Research at HMS. Sinclair says the Hoffs’ generosity will allow his lab to explore new ways to rejuvenate tissues to treat and cure age-related diseases.

“We have discovered that cells have a reset switch that can be used to reverse the age of cells and tissues—to reverse blindness in old mice, for example,” Sinclair says. “Our goal is to understand where the reset information resides in the cell and find novel ways to rejuvenate tissues that are old or diseased.”

The Hoffs say that Sinclair was an obvious target for their philanthropy due to his painstaking and prolonged efforts to advance the field of regenerative medicine. In May, Sinclair spoke at the fifth International Vatican Conference, held virtually, to share some of the insights he’s gleaned from his 25 years as a longevity researcher. While answering questions during a session titled “Living Healthily to 120 and Beyond,” he emphasized the need for more people to invest in research on the biology of aging.

“The public has woken up, and a lot of people have realized that addressing aging is the biggest impact we can have on human health by far,” Sinclair said. “If you smoke, your chances of lung cancer go up fivefold. But aging from 20 to 70 increases your chances over a hundredfold. Aging is the major factor of not just cancer but of most suffering on the planet.”



In 2016, 49 million U.S. adults were 65 or older, representing 15% of the population, according to the Centers for Disease Control and Prevention. That number is expected to reach 71 million by 2030 and 98 million by 2060—when older adults will make up nearly 25% of the population.

The 2021-2022 HBI Bipolar Disorder Seed Grant Program awardees are investigators working across five institutions and 10 labs. They are:

- **Todd E. Anthony, PhD**  
*HMS and Boston Children’s Hospital*  
Mechanisms underlying co-morbidity of mood and sleep disruptions in bipolar disorder
- **Katherine E. Burdick, PhD**  
*HMS and Brigham and Women’s Hospital*  
Immune-related treatment targets in bipolar disorder
- **Ryan Doan, PhD**  
*HMS and Boston Children’s Hospital*  
Noncoding genetics of bipolar disorder
- **Susan M. Dymecki, MD, PhD**  
*Harvard Medical School*  
A specialized brainstem cell type may link mood disorders with seasonal changes in day length
- **Rakesh Karmacharya, AB ’92, MMSc ’09, MD, PhD**  
*HMS and Massachusetts General Hospital*  
Neural network activity in patient-derived brain organoids in bipolar disorder
- **Jonathan Lipton, MD, PhD**  
*HMS and Boston Children’s Hospital*  
Exploring local circadian control of presynaptic function as a therapeutic target in bipolar disorder
- **Pamela Mahon, PhD**  
**Alexander P. Lin, PhD**  
*HMS and Brigham and Women’s Hospital*  
Dynamic modulation of glutamate and GABA during an emotional linguistic task in bipolar disorder
- **Naoshige Uchida, PhD**  
*Harvard University*  
Balance between pessimism and optimism: using a novel theoretical framework to study bipolar and major depressive disorders
- **Charles J. Weitz, AB ’77, MD, PhD**  
*Harvard Medical School*  
A three-dimensional picture of the body’s circadian clock machinery
- **Tracy Young-Pearse, PhD**  
*HMS and Brigham and Women’s Hospital*  
Elucidating the function of the bipolar disorder risk gene POU3F2 in neurons

# DEVOTED TO THE NEXT GENERATION OF HMS STUDENTS



➔ For more than 40 years, Phyllis I. Gardner, MD '76, has generously given to Harvard Medical School in support of its mission. Most recently, her gifts have focused on REACH, a program that makes it more feasible for those who are from disadvantaged backgrounds, including those historically underrepresented in medicine, to accept their offers of admission.

**“OUR GIFTS TO THE REACH PROGRAM ARE ONE WAY TO HELP DIVERSIFY THE HMS CLASS ECONOMICALLY AND RACIALLY SO THAT OUR GRADUATING STUDENTS MORE ACCURATELY REFLECT THE POPULATION THEY WILL BE SERVING.”**

PHYLLIS I. GARDNER

Gardner explains her motivation for supporting REACH by citing an interview given by journalist and best-selling author Ta-Nehisi Coates, who said that voicing concern about diversity and racism is not good enough. Rather, one must take action to effect change.

“Our gifts to the REACH program are one way to help diversify the HMS class economically and racially so that our graduating students more accurately

reflect the population they will be serving,” says Gardner, a member of the HMS Board of Fellows and the HMS Advisory Council on Education. She and her husband, Andrew J. Perlman, MD, PhD, made a \$100,000 gift to REACH earlier this year, on top of the nearly \$75,000 they have already given to the program.

REACH provides funding through HMS’s need-based financial aid program to reduce the loan component of a student’s financial aid package. It acknowledges student attributes of Resilience, Excellence, Achievement, Compassion, and a demonstrated commitment to Helping the underserved. Since the program’s inception in 2017, more than \$1.6 million has been distributed to 92 students.

## Returning the favor

Yeu-Tsu M. Lee, MD '61, has also been giving to HMS for more than 40 years, focusing mostly on financial aid. She previously established two charitable gift annuities to support current-use medical student scholarships, and most recently, she designated \$103,000 from a charitable remainder trust to support the same cause.

One of 12 children, Lee knows firsthand the importance of financial aid. Her family could not afford to support her desire to become a physician, so when she applied to HMS, she explained that she had no funds and could not pay her tuition. She was told that if she was good enough to be admitted, support would be provided.

Lee was plenty good enough. She would go on to build an illustrious career over more than five decades as a leader in academic surgery, medical education, research, and patient care. Lee says she gives back because she wants to help future generations of students, and because the support she received has allowed her to serve humanity through her work as a general surgeon and surgical oncologist.

## SHORE HONORED FOR OUTSTANDING VOLUNTEER WORK

➔ HMS Dean George Q. Daley, AB '82, MD '91, PhD, recently presented the 2021 Distinguished Service Award for Harvard Medical School Alumni to Eleanor Gossard Shore, AB '51, MD '55, MPH '70 (pictured), the former HMS dean for faculty affairs. The Alumni Council established the award in 2019 to recognize MD alumni who have demonstrated loyalty, service, and commitment to HMS through volunteering, community building, service as an ambassador for the School, or otherwise supporting the School and its mission.

Since her retirement, Shore has, among other volunteer efforts, helped the Center for the History of Medicine at Countway Library collect, share, and celebrate the achievements of women in medicine; organized events to celebrate the 70th anniversary of the matriculation of women at HMS; worked to empower international institutions

and faculty through her efforts with Real Colegio Complutense at Harvard and projects associated with Harvard Medical International; and, as part of the Shore Fellowship team, supported junior faculty who are pursuing academic work as they are assuming family or other responsibilities.

“Throughout all of this, it’s been my privilege and joy to be an alumna of, and volunteer for, Harvard Medical School,” Shore said at the virtual award presentation, which immediately followed the State of the School Address delivered by Daley during Reunion and Alumni Day in June (see Page 20).



TO NOMINATE A DESERVING ALUMNA OR ALUMNUS FOR THE 2022 AWARD, GO TO [ALUMNI.HMS.HARVARD.EDU/NOMINATION](https://alumni.hms.harvard.edu/nomination).





# IMPROVING CARE FOR THE ADULT AUTISTIC POPULATION

➔ Last year, the Centers for Disease Control and Prevention released its first study on U.S. adults with autism spectrum disorder (ASD), estimating that 1 adult out of 45—or about 5.4 million people age 18 or older—has ASD. Though this developmental disorder is typically studied in children, it is a lifelong condition. Many people with ASD need continuing support as they transition between pediatric and adult care, or between primary care providers and specialists.

Unfortunately, they aren't getting enough of this support, according to the findings of a pilot project led by the Office for External Education at Harvard Medical School. HMS received a \$375,000 grant in 2018 from the Nancy Lurie Marks Family Foundation to pursue the project, dubbed Phase One of the TEAMS (Targeted Education for Autism Management across Medical Specialties) Program. Ajay K. Singh, MBBS, MBA, senior associate dean for postgraduate medical education at HMS and principal investigator for TEAMS, says Phase One confirmed that there is “a tremendous unmet need for patients, their families, the health systems they navigate, and the many physicians and care providers who they depend upon for competent, coordinated care across medical and life span transitions.”

Now, the foundation, whose primary mission is to help people with autism lead fulfilling and rewarding lives, has awarded HMS more than \$2 million to address this unmet need during Phase Two of TEAMS, including developing an online educational program for clinicians across health care systems globally. The program will focus on the key aspects of adults with ASD that would support their care across medical specialties. Four course modules make up the program: the basics of ASD; adults with ASD; preparing for and supporting transitions; and best practices, strategies, and tools for treating and supporting patients with ASD.

“Training medical professionals in varied specialties to adapt to, understand, and care for adult patients with autism as they age is crucial to ensuring that this population receives optimal care,” says Judith Chan, program officer and director of communications for the foundation.

TEAMS Phase Two also includes the development of a web-based portal featuring patient and family educational materials aimed at improving health care for adults with ASD. Harvard Health Publishing, which draws on the expertise of more than 12,000 HMS faculty physicians to provide health information to people around the world, is proposing multiple communication strategies across a variety of media to educate and support ASD patients and their families as they navigate the health care system.



**CHRIS MCDUGLE, MD, THE NANCY LURIE MARKS PROFESSOR OF PSYCHIATRY AT MASSACHUSETTS GENERAL HOSPITAL, WHERE HE DIRECTS THE LURIE CENTER FOR AUTISM, INTERVIEWS A PATIENT WHO IS ON THE AUTISM SPECTRUM. AS CHAIR OF THE TEAMS ADVISORY BOARD, MCDUGLE SAYS, “I AM FORTUNATE TO HAVE THE OPPORTUNITY TO WORK WITH LEADERSHIP AT HMS IN THIS EFFORT TO IMPROVE MEDICAL CARE FOR ADULTS WITH AUTISM ACROSS THE GLOBE.”**

Beyond Phase Two, the TEAMS team hopes to launch live learning and leadership symposia activities and curate and adapt content for other audiences, particularly medical specialists most often seen by patients with ASD. All of these efforts align with the priorities of the foundation, which for years has emphasized improving health care experiences and access to medical services for individuals with autism across the life span and fostering a more comprehensive understanding of autism among clinicians.

“The NLM Family Foundation recognized the need to ensure that the specific health care needs of adults with autism are fully understood and addressed,” Chan says.

The Nancy Lurie Marks Family Foundation is committed to understanding autism from a scientific perspective, increasing opportunities and services available to the autism community, and educating the public about autism.

# TREMENDOUS GENEROSITY PROPELS SCHOOL’S MISSION

MD alumni gifts in FY21 ranged from \$10 to over \$100,000, with a median of \$250 and an average of \$3,300.

➔ Harvard Medical School alumni carry influence far beyond the Quadrangle. Their seminal contributions to science and medicine, along with their philanthropic commitment to HMS in support of its mission, have a ripple effect that can be felt in the world’s most remote places. In fiscal year 2021, which ran from July 1, 2020, through June 30, 2021, 2,559 MD alumni collectively gave more than \$5 million to HMS.

Alumni are encouraged to support the areas most meaningful to them. Last year, the vast majority designated their gifts to financial aid or flexible, unrestricted funding that can be used by HMS Dean George Q. Daley, AB ’82, MD ’91, PhD, where it’s needed most.

S. J. Adelstein, MD ’53, PhD, contributes annually to a scholarship established in his name by transferring money from his IRA, allowing him to reduce the required minimum distribution and giving him a tax benefit. Friends and colleagues established the scholarship, which benefits MD-PhD students, when Adelstein retired in 1997 as the HMS executive dean for academic programs.

“My whole career has been at HMS or one of its affiliated institutions. It’s a great pride of place for me. And while I’m very pleased that they set this scholarship up in my name, I’m also pleased to continue to help augment the endowment,” says Adelstein, a member of the Dean’s Council, HMS’s leadership annual giving society, and the Federman Loyalty Circle, which honors alumni who have made consecutive annual gifts of any size for five years or more. Adelstein has given to HMS for 40 straight years.

Laura Calvi, MD ’95, and Jonathan Friedberg, MD ’94, MMSc ’01, who married after meeting in medical school, are both academics at the University of Rochester School of Medicine. Longtime members of the Dean’s Council, the couple tout the benefits of unrestricted giving. “Sitting here in New York, we may not know what the priority is minute to minute, but we’re able to provide funding so the School has the flexibility to use the money in the best possible way,” says Friedberg.

Calvi adds that their confidence in HMS is high due to their own experiences. “As a student, I was always able to see medicine as an incredible opportunity to impact health—through education, but also through research and patient care. HMS taught us how to excel in all these aspects,” she says. “This is something that we saw while we were there training, and when we came back for our 25th Reunion a few years ago, the labs were different, the classrooms were different, but the attitude was the same. To me, that was really exciting.”

Friedberg credits the depth and breadth of his education, his many mentors, and his peers for opening doors and inspiring him to pursue a research career. “Only 160ish students a year are given this jewel of an opportunity to begin their medical education at HMS. I want to make sure they have the tools they need to succeed and to make an impact on the world,” he says.

Johnson Lightfoote, AB ’72, MD ’76, MBA, the medical director of Pomona Valley Imaging Medical Group in California, served on his 45th Reunion Committee and was inspired to support the School’s Diversity and Community Fund. He calls HMS a trendsetter and notes that many other medical schools imitated HMS’s initial diversity program, which began in 1969. “To the extent that Harvard has progressive plans, other institutions will follow. I use the phrase, ‘Harvard is first among equals,’” he says. “By helping Harvard achieve its goals of increasing diversity and representation, we improve not just Harvard, but other medical schools as well.”

Lightfoote, a member of the Dean’s Council and Federman Loyalty Circle, also helped organize an effort to raise funds for REACH scholarships, which make it more feasible for those from disadvantaged backgrounds, including those historically underrepresented in medicine, to accept their HMS offers of admission. “A Harvard education is a privilege. It’s an honor and an obligation to enable those coming after us to take advantage of the same opportunities,” Lightfoote says. “As our population becomes more and more diverse, we need more people who reflect the communities they work and live in.”

Natalie Tung, MD ’11, DDS, MBA, EdD, participates in the recurring giving program, providing monthly unrestricted support to the School as she pays off a Dean’s Council-level pledge. She says that while she was lucky not to be impacted financially by the COVID-19 pandemic, she realized that HMS would need unrestricted funds during this unprecedented time to help further its mission to improve health and well-being for all.

An academic oral and maxillofacial surgeon at the University of Southern California who celebrated her 10th Reunion this year, Tung says: “It was natural for me to give back to HMS, where I was trained to become not just a surgeon but a leader, trailblazer, and agent of change. In whatever spheres of influence I find myself in, I always ask how I can do better and make positive change.”



JONATHAN FRIEDBERG



JOHNSON LIGHTFOOTE



NATALIE TUNG



S. J. ADELSTEIN



LAURA CALVI



VIEW THE FY21 MD HONOR ROLL OF DONORS AT  
[ALUMNI.HMS.HARVARD.EDU/HONOR-ROLL](https://alumni.hms.harvard.edu/honor-roll).



# DONORS COME TOGETHER TO CREATE TWO GLOBAL HEALTH PROFESSORSHIPS

➔ A longtime supporter of both the Harvard Medical School Department of Global Health and Social Medicine (GHSM) and its leader, Paul Farmer, MD '88, PhD '90, presented HMS with a challenge: raise \$4 million within a certain timeframe, and the supporter would match the amount to create two endowed professorships within the department. Farmer, the Kolokotronis University Professor of Global Health and Social Medicine and a co-founder of Partners In Health, is widely admired and well-known for his efforts to improve the lives and health of poor people around the world—efforts documented in the film “Bending the Arc.”

Eight donors rose to the challenge, enabling HMS to complete its portion of the matching gift. The unique opportunity attracted longtime GHSM supporters, steadfast supporters of HMS giving to global health at Harvard for the first time, and a first-time donor to HMS who was incentivized by the challenge.

“We hope that these endowed professorships will carry Paul’s exceptional legacy forward and draw new donors into the HMS community, particularly in the area of global health,” says the donor who initiated the challenge and chooses to remain anonymous. “There is no area—nor leader—more deserving of our attention and support as we confront the inequities in health care brought to the fore by the COVID-19 pandemic.”

Alice and Rodman W. Moorhead III, AB '66, MBA '68, are also firm believers in Farmer and his team. Loyal supporters of neuroscience research at HMS, the couple recognized the urgent need to invest in global health and, more specifically, Farmer. “The issue of infectious disease is a major problem worldwide, and Paul has demonstrated his expertise in this field through his work on Ebola, HIV, and other communicable diseases,” says Rod Moorhead, a member of the HMS Board of Fellows and the HMS Discovery Council. Alice Moorhead says, “The pandemic pointed out how woefully inadequate and underfunded public health systems are across the world.”

An infectious disease doctor, Farmer bore witness to the 2014 Ebola outbreak in West Africa that killed more than 11,000 people. His latest book, “Fever, Feuds, and Diamonds: Ebola and the Ravages of History,” published last year, details the stories of those afflicted with the disease and describes the systemic health care failures that allowed the virus to spread and kill so rapidly. A lesson from the book, Farmer says, is that the high mortality from deadly pathogens should not simply be attributed to the virulence of the pathogen; rather, we must place an equal amount of blame on the inequalities that exist in medical care.

Paul Farmer was selected as the winner of the 2020 Berggruen Prize for Philosophy and Culture, which honors thinkers whose ideas have profoundly shaped human self-understanding and advancement in a rapidly changing world.

Farmer’s tireless efforts to rid health systems of these inequalities have resonated with a longtime backer of Farmer’s work who made a gift toward the professorship match. “My family is completely committed to Paul’s vision, his leadership, and his focus on global health equity,” says the donor, who chooses to remain anonymous. “This notion of high-quality health care as a human right is a concept we have signed up for without reservation, and thus supporting Paul and his team in this lifelong ambition is very easy.”

Ronda Stryker, a passionate human rights advocate, expresses a similar sentiment when describing her motivation to participate in the challenge. “Paul and his colleagues work every day to create a healthier and more equitable world. Their selflessness saves lives. I want to reinforce their efforts to strengthen health care systems in marginalized communities,” says Stryker, a member of the HMS Board of Fellows and HMS Advisory Council on Global Health and Service.

Mala Gaonkar, AB '91, MBA '96, is interested in supporting the academic discipline around improving those systems, hence her support of Farmer and GHSM. “I met Paul around 15 years ago, and he would discuss ideas around how to improve public health service delivery and how to make that into a real discipline. It’s wonderful to see those ideas not only come to fruition but expand within the department.”

Farmer says he’s humbled and deeply gratified to have the support and confidence of those who made the professorships possible, helping to secure the future of GHSM and advance the department’s work at the intersection of health care and human rights. “This support will allow us to conduct the rigorous research needed to inform our work in the field and ultimately raise the standard of care for the poor. And it will help us to improve, through teaching, the foundations of our future global health leaders.”

One of the new professorships is named the Professorship of Global Health and Social Medicine in the Field of Medical Anthropology. It will be renamed after Farmer’s mentor, Arthur M. Kleinman, AM '74, MD, a professor of medical

anthropology in GHSM, a professor of psychiatry at HMS and Cambridge Health Alliance, and the Esther and Sidney Rabb Professor of Anthropology in the Faculty of Arts and Sciences, upon his retirement from Harvard University. The other professorship is the Jeffrey Cheah Professorship of Global Health and Social Medicine, named after Tan Sri Jeffrey Cheah, whose gift toward the professorship match was his first to HMS.

Cheah is the founder and chairman of the Sunway Group, a Malaysian conglomerate created on the concept of sustainable development. He is also the founder of Sunway University, which is pursuing a healthier planet, better health care delivery, and greater health equity. In this pursuit, Cheah would like to emulate Harvard’s success. “To be the best, we must work with the best and learn from the best, and Harvard and Paul Farmer obviously rank high on the list,” he says.



AT HÔPITAL UNIVERSITAIRE DE MIREBALAIS IN HAITI, PAUL FARMER CHECKS ON ETIENNE BINALSON, WHO WAS INJURED DURING THE 7.2 MAGNITUDE EARTHQUAKE THAT STRUCK HAITI IN AUGUST. IMAGE: PARTNERS IN HEALTH/NADIA TODRES

# ENSURING THAT EVERYONE GETS THE CARE THEY NEED

➔ Salmaan Keshavjee, MD, SM '93, AM '95, PhD '98, a professor of global health and social medicine in the Blavatnik Institute at Harvard Medical School and director of the HMS Center for Global Health Delivery, says that Malaysia, with its universal health coverage, is the perfect place to be thinking about how to improve the “last mile” of health care delivery.

**“THE NEED FOR GREATER INVESTMENT IN GLOBAL HEALTH RESEARCH HAS BEEN LAID BARE BY THE PANDEMIC.”**

JEFFREY CHEAH

“How do you take the services we have and make sure everyone gets them? How do you improve lives? We want to look at how to translate knowledge from the clinic into improved outcomes in the communities where people live and work,” says Keshavjee (pictured working in Bangladesh), who will get that opportunity thanks to a \$1 million gift from the Jeffrey Cheah Foundation establishing the Jeffrey Cheah Research Fund at HMS. The fund will support research, medical education, and training that promise to enhance health systems and advance patient outcomes, with a focus on

Southeast Asia, particularly Malaysia. “After all, what is health care if we aren’t able to deliver it to those that need it the most? Malaysia has the perfect infrastructure for this,” Keshavjee says.

Tan Sri Jeffrey Cheah, the founder and trustee of the Jeffrey Cheah Foundation, says: “The need for greater investment in global health research has been laid bare by the pandemic. Dr. Keshavjee has a great track record in improving health and achieving health equity for people worldwide. His support of the Zero TB Initiative and his collaborative work with Partners In Health to improve care in impoverished communities reflect his commitment and dedication in this sphere, making him an ideal candidate to support.” An avid philanthropist who funds scholarships and educational causes, Cheah is also the founder and chairman of the Sunway Group, one of Malaysia’s leading conglomerates.

Keshavjee says the main health issues to address in Southeast Asia are growing rates of diabetes and obesity, but he also cites tuberculosis and hepatitis, which are treatable and preventable. “Eventually, we would also like to explore planetary health and the environment. In particular, data suggest air pollution contributes to diabetes and early heart disease. We want to take a broader view than simply throwing pills at people,” he says. “We want to look at aging, pollution, and the effects of environmental changes, such as water levels, heat patterns, and vector-borne diseases, on human health.”

That approach is hugely important to Cheah. “The very founding of the Sunway Group was based on the concept of sustainable development,” he says. “We look forward to collaborating with Harvard Medical School on further advancing the goal of global and planetary health.”

As of 2020, the Jeffrey Cheah Foundation has awarded more than \$128 million in scholarships to thousands of deserving students in various fields of study.





# EHC SPOTLIGHT: PAUL WEIDEN, AB '63, MD '67

PAUL WEIDEN WITH  
HIS WIFE, BEVERLY  
LINKLETTER.



➔ “My appreciation of the benefits of charitable remainder trusts (CRTs) to both Harvard and my family began in the previous century, when my mother established a CRT for herself and then me with a real estate asset she no longer wanted to oversee. Managed as part of Harvard’s endowment with no direct fees, that trust has grown and now continues to provide ongoing income. In this century, I married Bev and decided, as part of my tax strategy and estate planning, to set up CRTs on a consistent basis for reunions of both the College and Medical School. This has provided meaningful tax savings and regular income, the latter intended

primarily for the long-term support of my wife, who is younger, and of course, ultimately for students who will receive support from the Weiden Family Scholarship Funds. In addition, I am optimistic that my children, both Harvard College graduates, will choose to continue this rewarding family tradition.”

*The Ezekiel Hersey Council recognizes those who have created a life income gift, named HMS as a beneficiary of a retirement account or existing donor-advised fund, or included HMS in their will or trust. Learn more at [hms.harvard.edu/EHC](https://hms.harvard.edu/EHC).*

# ALPERT PRIZE HONORS TWO SCIENTISTS WHO ELUCIDATED RNA FUNCTION

➔ The two winners of the 2021 Warren Alpert Foundation Prize were recognized during a virtual symposium Oct. 7 for their seminal discoveries in the biology and function of RNA, the workhorse molecule of cells. Their discoveries have reshaped the understanding of RNA’s myriad roles in healthy cell function and in disease-causing dysfunction and have informed the conceptualization and design of RNA-based therapies in various stages of development.

Administered by Harvard Medical School, the \$500,000 prize will be shared by the two winners: Joan Steitz, AM '67, PhD '68, the Sterling Professor of Molecular Biophysics and Biochemistry at Yale University School of Medicine and an investigator at the Howard Hughes Medical Institute, and Lynne Maquat, PhD, the J. Lowell Orbison Endowed Chair and a professor of biochemistry and biophysics at the University of Rochester, where she is also the founding director of the Center for RNA Biology and the founding chair of Graduate Women in Science.

Understanding the biology and function of RNA stems from the collective work of numerous scientists over many years. However, the

discoveries made by Maquat and Steitz have contributed critical knowledge about RNA’s involvement in a range of cellular processes, including regulation of gene expression and protein production.

These insights have, in turn, enabled the design and subsequent development of a range of therapies, including mRNA-based COVID-19 vaccines and treatments for spinal muscular atrophy and Duchenne muscular dystrophy. The discoveries have also laid the foundation for the design of other RNA-based treatments now in various stages of testing or development, including personalized cancer vaccines.

Including the 2021 prize, the Warren Alpert Foundation has awarded nearly \$6 million to 74 individuals in recognition of work that has promised to revolutionize how we understand, diagnose, and treat disease. Since the inception of the award in 1987, 12 honorees have gone on to receive Nobel prizes.

▶ LEARN MORE ABOUT THE PRIZE AND ITS PAST  
RECIPIENTS AT [WARRENALPERT.ORG/PRIZE](https://warrenalpert.org/prize).



LYNNE MAQUAT



JOAN STEITZ

# STRENGTHENING THE FUTURE LEADERS IN BIOMEDICAL SCIENCE

➔ When the COVID-19 pandemic ends, the world can thank biotech innovators and scientists for their incredible service. These are the people whose creative work includes developing vaccines, inventing new therapies, and studying the root causes of the disparities between populations in health care access and patient outcomes. Thankfully, the Harvard-MIT Program in Health Sciences and Technology (HST) has been training these pioneers in science for 50 years.

**“THE INTENSIVE TRAINING STUDENTS GET WITH WORLD-CLASS RESEARCH MENTORS OVER A FULL YEAR CAN TRULY TRANSFORM THEIR PROFESSIONAL CAREERS.”**

EDWARD M. HUNDERT

This unique collaboration brings together Harvard Medical School, Harvard University, Harvard-affiliated teaching hospitals, the Massachusetts Institute of Technology, and local research centers to integrate science, medicine, and engineering to solve problems in human health.

“I am so inspired when I hear HST faculty, students, and alumni talking about the exciting new approaches that are being taken to solve the world’s most pressing public health challenges,” says HMS Dean for Medical Education Edward M. Hundert, MD ’84.

He says that many HST students bolster their physician-scientist credentials by spending a fifth year doing laboratory research. “The intensive training students get with world-class research mentors over a full year can truly transform their professional careers.”

Giving students the freedom to choose their own research paths—to follow their ideas without being beholden to someone else’s funding agenda—is very important to HST alumnus Martin Prince, MD ’85. He says that during his HST years, he received fellowship support that guaranteed him that freedom, and since then, he’s wanted to give back to the program.

“Now that we are celebrating the 50th anniversary of HST, the timing is perfect for endowing a fifth-year research fellowship,” remarks Prince, a steadfast HMS supporter whose recent \$1 million gift will do just that. With a background in mechanical engineering, he says he was drawn to HST for its quantitative and problem-solving approach. “HST reinforces and emphasizes the application of scientific principles and logical thinking in preference to rote memorization. Over the years, I have found this focus on learning principles to be helpful in dealing with new challenges and for solving the really difficult cases,” says Prince, a professor of radiology at Weill Cornell Medical College and Columbia University College of Physicians and Surgeons. He is known for developing contrast-enhanced magnetic resonance angiography, which offers high-spatial-resolution images of the blood vessels.

Hundert, who has known Prince since they entered HMS together as part of the Class of 1984, says he is inspired by Prince’s successes in biomedical innovation as well as his generous philanthropic support of HMS. “Thanks to funding like this, generations of amazing HST students will have positive ripple effects through their work in science, in the care of patients, and in teaching and mentoring their own students to pay it forward,” Hundert says.

Alumni of the HST program are responsible for countless groundbreaking innovations, including the drug regimen that transformed HIV/AIDS into a treatable disease and the first non-invasive technology for observing the brain in action.

LONDON SOCIETY STUDENTS, ALL MEMBERS OF THE HARVARD-MIT PROGRAM IN HEALTH SCIENCES AND TECHNOLOGY, POSE FOR A PHOTO AFTER RECEIVING THEIR WHITE COATS IN EARLY AUGUST.





# SEEKING A VACCINE THAT WOULD SAVE MORE KIDS

➔ Each year, diarrhea—usually a symptom of an infection in the intestinal tract—kills about 525,000 children under the age of 5, according to the World Health Organization. But while successful vaccination represents the most expeditious and practical way to reduce the impact of these infections in the developing world, a major obstacle remains: Oral vaccines do not provide the same level of protection in low-income settings as they do in high-income settings.

Experts cite many potential reasons for this poor immune response—for example, intestinal inflammation or gut microbiome alterations resulting from lifestyle-related or environmental factors. Whatever the reasons, Ulrich von Andrian, MD, PhD, Edward Mallinckrodt Jr. Professor of Immunopathology in the Blavatnik Institute at Harvard Medical School and director of the Center for Immune Imaging at HMS, along with investigators from the University of Washington and the Massachusetts Institute of Technology, formed the Mucosal Vaccine Consortium (MVC) five years ago to develop a non-oral vaccine to protect the lining of the intestines, or intestinal mucosa, which functions as a physical and immunological defense barrier.

**“THE ONGOING SUPPORT FROM THE GATES FOUNDATION IS ESSENTIAL TO ALLOW THIS WORK TO PROCEED.”**

ULRICH VON ANDRIAN

Fast forward to today, and the MVC has identified a nanoparticle-based vaccine candidate that elicits the desired mucosal immune response in mouse studies. Von Andrian will further optimize, test, and characterize the consortium's vaccine modality in rodent models thanks to a \$1.1 million grant from the Bill & Melinda Gates Foundation. The foundation, which has been fighting poverty, disease, and inequity around the world for more than 20 years, previously gave nearly \$2.7 million to von Andrian for this work and has committed more than \$6 million in total to the consortium.

“As this project progresses from the basic research and discovery phase to a focus on developing and optimizing our candidate nanoparticles, it can be more difficult to finance with traditional funding mechanisms,” von Andrian says. “The ongoing support from the Gates Foundation is essential to allow this work to proceed.”

Anastazia Older Aguilar, program officer for vaccine discovery at the Gates Foundation, says mucosal targeting is important across most of the foundation's priority pathogens, but it has found few adjuvant candidates that can direct mucosal immune responses. An adjuvant is an ingredient



used in some vaccines that enhances the body's immune response to an antigen. “Dr. von Andrian's program may provide a way to overcome this challenge by adding mucosal targeting signals to vaccines, without the requirement of a healthy gut immune response in the individual to develop those signals,” she says.

Von Andrian says the ongoing work focuses specifically on nanomaterials provided by collaborators at MIT, illustrating the importance of team science in advancing this vaccine project. “The synergistic combination of unique technical and scientific expertise in nanotechnology at MIT and immunology at HMS is critical to bring this project to fruition,” he says.

**Diarrhea kills more children every day than AIDS, malaria, and measles combined, according to the Centers for Disease Control and Prevention.**

**WHILE THE ORAL ROTAVIRUS VACCINE HAS BEEN SHOWN TO DRAMATICALLY REDUCE DIARRHEAL HOSPITALIZATIONS AND DEATHS IN CHILDREN UNDER 5, IT HAS ALSO PROVEN TO BE MUCH LESS EFFECTIVE IN LOW-INCOME SETTINGS COMPARED TO HIGH-INCOME ONES.**

IMAGE: ©GATES ARCHIVE/  
DOMINIQUE CATTON

# GRATEFUL FORMER STUDENT CONTINUES TO GIVE BACK

➔ After three years as a PhD student at Harvard Medical School, Lee Zhang, AM '01, decided he wanted to take a leave of absence from the lab and join one of the earliest internet companies in China. However, he was very nervous to share his plan with the lab's leader, Constance Cepko, PhD, the Bullard Professor of Genetics and Neuroscience in the Blavatnik Institute at HMS, for fear of being met with disapproval.

"But Connie told me to follow my heart and encouraged me to do something new," says Zhang, who praised Cepko's unwavering support of students, as well as her dedication to and passion for science.

Fast forward five years, circa 2003, and Zhang had built his own internet company, eLong, into one of China's largest online travel service companies. Around that time, he met with three HMS professors who were on a graduate program recruitment trip in China. They suggested that Zhang consider starting a business in the health care sector, but he had no plans to leave eLong. Soon after, though, his first child was born, and he says he saw firsthand that public hospitals in China were underdeveloped. He noticed that doctors had only several minutes for each patient because so many people were waiting for care.

"With the idea to build a better care system in China, I eventually founded iKang as iKang.com in 2004," Zhang says. "I tried to bring internet solutions to health care just as eLong.com did for travel service in China." Today, iKang operates about 150 medical centers in 60 cities in mainland

China and Hong Kong and provides medical services to about 8 million people annually.

"Without the education I received from HMS, and the suggestion and support of those three HMS professors—Tom Fox, PhD; Thomas Roberts, PhD '76; and Yang Shi, PhD—iKang would not have existed," Zhang says. (Fox is now retired, while Roberts remains on the HMS faculty, and Shi is at the Oxford Branch of the Ludwig Institute for Cancer Research.) To express thanks to the HMS community, Zhang began supporting fellows in the Leder Human Biology & Translational Medicine Program (LHB), which was launched by Cepko about 15 years ago. LHB aims to give PhD students the opportunity to learn more about human biology and disease, while also facilitating the clinical and cultural experiences that enable collaborations between physicians and scientists.

**"WE HAVE SO MANY DESERVING, EXCELLENT APPLICANTS FROM OTHER COUNTRIES, ESPECIALLY CHINA, THAT IT IS ALWAYS SO HARD TO NOT BE ABLE TO OFFER THEM ADMISSION."**

CONSTANCE CEPKO

"The program was inspired by the founder of the HMS Department of Genetics, Phil Leder, AB '56, MD '60, whose own career was a wonderful example of rigorous research aimed at translation," says Cepko, who co-directs the program along with Thomas Michel, AB '77, MD, PhD, an HMS professor of medicine at Brigham and Women's Hospital.

Expanding on his previous support of LHB, Zhang, along with his wife, Faith Feiyan Huang, recently made a \$1 million gift establishing the Huang & Zhang Fellowship in Biology and Translational Medicine. The couple's preference is to support international students, particularly fellows from China.

"We have so many deserving, excellent applicants from other countries, especially China, that it is always so hard to not be able to offer them admission," says Cepko, who praised the couple's generosity.

Zhang says he would not have been able to come to Harvard 25 years ago without the University's "open heart and financial support," and for that, he is forever thankful. Reflecting on his time as a student, he says, "Both Connie and Phil let me feel nothing is impossible. There is always a whole world out there worth exploring."

PHD STUDENTS IN THE LEDER PROGRAM EMBARK ON A SAILING TRIP IN 2018.



LEARN MORE ABOUT  
THE LEDER PROGRAM AT  
[LHBTM.SQUARESPACE.COM](http://LHBTM.SQUARESPACE.COM).



# MAKING MEDICAL EDUCATION ACCESSIBLE TO ALL

➔ The William Randolph Hearst Foundation prides itself on funding educational institutions that demonstrate remarkable success in preparing students to thrive in a global society. That might explain its decades-long support of Harvard, for which it has provided millions of dollars in scholarship and research funding. Recently, the foundation became interested in supporting Harvard Medical School's REACH program, which makes it more feasible for those who are from disadvantaged backgrounds, including those underrepresented in medicine, to accept their offers of admission.

“What struck us is that REACH students, many of whom come from rural communities or grow up in poverty, often return to their communities to provide care,” says George Irish, eastern director of the foundation, which made a \$500,000 gift to the program.

**“I AM TRULY GRATEFUL THAT REACH HAS ALLOWED US TO RECRUIT SUCH WONDERFUL YOUNG PHYSICIANS AND RETAIN A DIVERSE STUDENT BODY.”**

FIDENCIO SALDAÑA

REACH, administered through HMS's need-based financial aid program, decreases the loan burden for students who demonstrate qualities of Resilience, Excellence, Achievement, Compassion, and Helping the underserved. Irish says he appreciates that REACH covers costs beyond tuition. “A full



scholarship to medical school is great, but students have significant unmet needs beyond tuition,” he says. “We must help them cover those additional expenses, lest those costs prohibit them from pursuing a degree.”

HMS Dean for Students Fidencio Saldaña, MD '01, MPH '05, concurs with that sentiment: “Being in medical school is expensive. There are living expenses and other costs to financing a medical education. Covering costs beyond tuition is a really progressive thing.”

Saldaña says he's heard some incredible stories from REACH recipients who say that the scholarship was critical for them to attend HMS. When he considers what those students have accomplished academically and within their communities, he says he could not imagine their absence from HMS. “I am truly grateful that REACH has allowed us to recruit such wonderful young physicians and retain a diverse student body.”

**IN EARLY AUGUST, MEMBERS OF THE HARVARD MEDICAL SCHOOL AND HARVARD SCHOOL OF DENTAL MEDICINE CLASS OF 2025 ARRIVED ON CAMPUS TO START THEIR NEW JOURNEYS.**

**RENEWED**  
Through  
Calendar Year  
2021 Only

## CARES ACT PROVISIONS EXTENDED

**The Federal Coronavirus Response and Consolidated Appropriations Act of 2021 includes updates that extend CARES Act provisions and tax incentives for donors this year:**

1. Donors who do not itemize deductions on their taxes can now deduct up to \$300 in cash gifts. Jointly filing couples can deduct up to \$600 in cash gifts.
2. Donors who itemize can deduct up to 100% of their adjusted gross income for cash gifts. This deduction does not apply to gifts contributed to donor-advised funds.
3. Donors 72 or older must take their required minimum distribution (RMD) from retirement plans in 2021. One option to consider is gifting it directly to charities to avoid taxable income.

**Call Kate Murphy in Gift Planning at 1-800-922-1782 for more information.**

# VIRTUAL REALITY: ONLINE REUNION RECONNECTS ALUMNI



CLOCKWISE FROM TOP LEFT: ANDREA EWING REID, JOAN REEDE, ANDRÉ CHURCHWELL, EVE J. HIGGINBOTHAM, AND THOMAS SEQUIST RESPOND TO QUESTIONS DURING THE JUNE 4 WEBINAR “COVID-19’S WAKE-UP CALL: RACIAL JUSTICE IN MEDICINE.”

➔ While this year’s Reunion was not a traditional in-person event, virtual activities attracted hundreds of Harvard Medical School alumni and offered unique opportunities for members of classes ending in 1 or 6 to reconnect with each other and hear updates about the School.

The festivities began with a Reunion Kickoff Happy Hour on June 3, during which HMS Chair of Alumni Relations A.W. Karchmer, MD ’64, and event emcee Shira Sivan Simon, MD ’12 (Class of 2011), welcomed nearly 200 alumni. After toasting the start of Reunion, everyone moved into smaller breakout rooms to participate in lively conversations with current students. Alumni discussed non-traditional career trajectories and the importance of mentorship and lifelong learning, while also sharing their favorite memories and giving advice to the students. The evening concluded with an unofficial after-party, which allowed classmates to gather and catch up in private breakout rooms.

On June 4, Karchmer hosted the State of the School webinar, which began with brief remarks from outgoing Harvard Medical Alumni Association President Michael Rosenblatt, MD ’73. Rosenblatt shared the Alumni Council election results (see Page 23) and updates about the Council’s pursuit of a debt-free

MD program at HMS. Dean George Q. Daley, AB ’82, MD ’91, PhD, who also served on his Reunion Committee this year, then delivered the State of the School Address, during which he presented the 2021 Distinguished Service Award for Harvard Medical School Alumni to Eleanor Gossard Shore, AB ’51, MD ’55, MPH ’70 (see Page 11).

Later that day, a symposium led by HMS Dean for Diversity and Community Partnership Joan Reede, MD, MPH ’90, SM ’92, MBA, featured four alumni who spoke about disparities in COVID-19 health care and racism in medical education. Reede concluded the session by saying, “Change needs to involve all of us. This is not about one office or one person. This is about our collectively coming together.” The speakers were André L. Churchwell, MD ’79, vice chancellor for equity, diversity, and inclusion at Vanderbilt University and Levi Watkins, Jr., M.D. Chair and chief diversity officer at Vanderbilt University Medical Center; Eve J. Higginbotham, MD ’79, vice dean for inclusion and diversity at the University of Pennsylvania’s Perelman School of Medicine; Andrea Ewing Reid, MD ’88, MPH ’01, associate dean for student and multicultural affairs in the HMS Program in Medical Education and director of the HMS Office of Recruitment and Multicultural Affairs; and Thomas Sequist, MD ’99,

MPH ’04, chief patient experience and equity officer at Mass General Brigham and professor of medicine and health care policy at HMS.

The 12 milestone classes also enjoyed private Zoom events from June 4–6, engaging in an array of activities, including trivia, wine tastings, group discussions, and formal talks.

More than 160 class Reunion Committee volunteers helped plan these events, raise Reunion class gifts, and boost Reunion Report participation, leading to 955 alumni submissions to these historical class books.



“THANK YOU TO OUR EXTRAORDINARY ALUMNI, WHO’VE BEEN PROVIDING LEADERSHIP AND SERVICE—BEFORE AND DURING THE PANDEMIC—ACROSS THE NATION AND AROUND THE WORLD. YOU MAKE US SO PROUD.”

GEORGE Q. DALEY

Reunion Giving  
\$5.6 million  
raised by 656  
alumni donors\*

\* TOTAL INCLUDES OUTRIGHT GIFTS, PLEDGES TO BE PAID OVER FIVE YEARS, BEQUESTS, AND OTHER UNIQUE GIFTS THAT ALLOW ALUMNI TO STRETCH THEIR GIVING.



Visit the Reunion recap webpage to see event highlights at [alumni.hms.harvard.edu/2021-recap](https://alumni.hms.harvard.edu/2021-recap).



THE CLASS OF 1996 CELEBRATES ITS 25TH REUNION. IT HELD A PRIVATE SYMPOSIUM AND SOCIAL SESSION ON JUNE 5 AND A WELLNESS DISCUSSION ON JUNE 6.





FINANCIAL AID AND EDUCATION

# SPREADING THE JOY

➔ James “Jim” Vernon, MD ’61, does not think of himself as a philanthropist, yet he has made an impact on countless lives as a surgeon, husband, father, and grandfather, approaching each role with humor and humility.

Vernon realized he wanted to be a physician while studying chemistry at Amherst College. As much as he enjoyed learning about science, he recognized that a career solely in a laboratory was not going to fulfill his desire to interact with people, which he found to be more fun and invigorating. Medicine, it turned out, was the perfect blend of science and social interaction.

“Life has been a true joy thanks to medicine,” Vernon says. “Being a physician energized me, and I looked forward to providing the best patient care every day. I want to help other medical students find as much joy in the profession as I found during my career.” To that end, and in honor of his 60th Reunion, Vernon recently committed \$1 million in financial aid to Harvard Medical School by establishing a blended gift of appreciated stock and a charitable gift annuity (CGA).

“I WANT TO HELP OTHER MEDICAL STUDENTS FIND AS MUCH JOY IN THE PROFESSION AS I FOUND DURING MY CAREER.”

JAMES VERNON

“Borrowing money for graduate studies is an anathema for me,” says Vernon, who is hoping his gift will contribute to the next generation of medical students leaving school debt-free. By establishing his gift partially through a CGA, he will receive fixed income for life—a benefit that made the gift manageable, he says.



A JOYFUL OWAIS FAZAL WEARS THE WHITE COAT THAT HE RECEIVED DURING WELCOME WEEK ACTIVITIES FOR CLASS OF 2025 MEDICAL STUDENTS IN EARLY AUGUST.

Students in the HMS Class of 2020 graduated with an average medical debt of \$106,877, while the national average at private medical schools was \$185,682, according to the HMS Financial Aid Office.

He is able to fulfill his near-term financial goals, including providing tuition support for his grandchildren, while pledging additional financial aid support to medical students at HMS.

“I have been privileged and blessed to be a member of Harvard Medical School. I feel my education there was second to none,” Vernon says. “I am grateful to have completed my training at HMS, and I am happy to help others share in that experience with this gift.”

Vernon may not think of himself as a philanthropist, but he is likely alone in that diagnosis.



## ALUMNI DAY



➔ Like Reunion, Alumni Day also shifted its format. Alumni not celebrating a Reunion this year were invited to participate in the two webinars offered during Reunion (see opposite page). Learn more at [alumni.hms.harvard.edu/alumni-day](https://alumni.hms.harvard.edu/alumni-day).

# FUJIFILM BRINGS THE FUTURE OF THERAPEUTICS INTO SHARPER FOCUS

➔ While the Fujifilm name may be synonymous with excellence in camera technology, the company is also passionate about translating advances in fundamental science research into innovative biomedical solutions and therapeutics. Since 2019, when the company made a \$1 million gift to HMS, 11 PhD candidates have received the Fujifilm Fellowship, which awards two years of research funding to promising students from across the nine HMS-based life sciences PhD programs. Now, Fujifilm is renewing its support, making a gift of \$1.5 million to create additional fellowship opportunities.

**“THE FUJIFILM FELLOWSHIP AT HARVARD MEDICAL SCHOOL IS FUELED BY OUR MUTUAL ‘GENKI’—OUR PASSION, DRIVE, AND ENERGY TO ACHIEVE MEDICAL GOALS THAT WERE PREVIOUSLY UNACHIEVABLE.”**

TEIICHI GOTO

“Fujifilm’s deep partnership with Harvard Medical School continues to grow as we both relentlessly pursue the development and discovery of new medicines that will, one day, cure diseases around the world,” says Teiichi Goto, president and CEO of FUJIFILM Corporation (Fujifilm). “Our company is inspired and motivated by the work of these exceptional doctoral fellows, who are preparing for their life-transforming work. The Fujifilm Fellowship at Harvard Medical School is fueled by our mutual ‘Genki’—our passion, drive, and energy to achieve medical goals that were previously unachievable.”

The fellowship program is designed to equip young scientists with the specialized skills needed to translate their research findings into real medical solutions for patients. In addition to their PhD program, the Fujifilm Fellows are enrolled in the Therapeutics Graduate Program, a new curriculum that focuses on pharmacology, toxicology, and drug discovery. Students in the program receive rigorous multidisciplinary training in identifying and developing novel therapeutics, understanding and investigating mechanisms of drug action, analyzing the reasons for clinical failures, and developing new compounds and applying them in preclinical and clinical studies to improve the treatment of disease.

#### A pipeline of pioneers

Thanks to the additional support from Fujifilm, Kailyn Doiron and Kanae Sasaki were named in August as the summer 2021 recipients of the Fujifilm Fellowship. Doiron, a first-generation

college student and a third-year student in the Systems, Synthetic, and Quantitative Biology PhD Program, works in the lab of Pamela Silver, PhD, the Elliott T. and Onie H. Adams Professor of Biochemistry and Systems Biology, in the Blavatnik Institute at HMS. She strives to develop novel protein-based therapeutics to address the unmet medical need for safe and effective chronic and inflammatory pain treatments. Doiron says she is excited by the recent success of newly approved protein therapeutics for treating migraines, as they show promising evidence for the future of protein-based chronic pain drugs.

“I was incredibly honored when I heard that I had been named a Fujifilm Fellow,” says Doiron. “I immediately shared the great news with my biggest cheerleaders: my family. I am very thankful to Fujifilm for the support and cannot wait to share my experience and findings with the scientific community.”

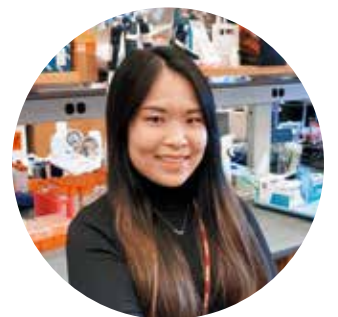
After an exciting experience working with an off-target detection platform for CRISPR/Cas9 gene editing technology at Massachusetts General Hospital, Sasaki decided to join Harvard’s Biological and Biomedical Sciences PhD Program. She is now studying gene therapy for a retinal degenerative disease, retinitis pigmentosa (RP), in the lab of Constance Cepko, PhD, the Bullard Professor of Genetics and Neuroscience in the Blavatnik Institute at HMS.

RP, which affects about 1 in 4,000 people, causes night blindness and can eventually lead to complete blindness. Sasaki hopes that her efforts to develop gene therapies that prolong photoreceptor cell survival can help these patients retain their sight and improve their quality of life.

“I’m very grateful to see that such a famous company is willing to invest not only in the science but also the development of researchers,” says Sasaki.



KAILYN DOIRON



KANAE SASAKI

Fujifilm applies its expertise in photographic technologies to a broad range of biomedical applications. The health care fields of disease prevention, diagnosis, and treatment account for more than 20% of the company’s total sales.



# THE POWER TO TRANSFORM GLOBAL MENTAL HEALTH



➔ Even before the arrival of a pandemic that would kill millions of people, force millions more out of the workforce, and inflame the social vulnerabilities of society, mental health problems were a leading cause of suffering and a dangerously neglected area of public health. Now, as these problems increase, Vikram Patel (pictured), MBBS, MSc, PhD, the Pershing Square Professor of Global Health in the Blavatnik Institute at Harvard Medical School, says we must consider a radically different approach to mental health care.

“The most innovative solution is the deployment of widely available, community-based human resources to deliver front-line mental health care,” Patel says. He leads the EMPOWER initiative at HMS, which is using digital training and supervision tools to scale this innovation by enabling anyone, anywhere, to master the delivery

of brief psychosocial interventions that address mental health problems.

Mala Gaonkar, AB '91, MBA '96, has a longstanding interest in developing scalable solutions to the most stubborn health problems. In 2015, she co-founded the Surgo Foundation, a non-profit “action tank,” to pursue that interest. She recently made a significant gift to HMS via Surgo in support of Patel’s efforts to train lay health workers to address the massive gaps in mental health care.

“Community health workers provide an extraordinary return on investment in global health intervention,” Gaonkar says. “These are trusted members of the community who will not abandon their people.”

Patel says he is excited that EMPOWER’s tools are simultaneously being applied in under-resourced areas in both the U.S. and India. But he says the demand to bring the EMPOWER program to more communities is so great that he can’t address it without a core team at HMS that can provide technical help and guidance to implementers.

“My immediate goal is to secure an endowment that can sustain an EMPOWER team in perpetuity and support implementers in any part of the world as they build their mental health workforce and, ultimately, reduce the burden of mental health-related suffering,” he says.



LEARN MORE ABOUT THE EMPOWER INITIATIVE AT [EMPOWER.CARE](https://empower.care).

Suicide is the second leading cause of death among 15- to 29-year-olds globally, and up to 20% of the world’s children and adolescents experience a mental health problem, according to the World Health Organization.

## ALUMNI COUNCIL WELCOMES 4 NEW MEMBERS



LEARN MORE ABOUT THE NEWEST MEMBERS OF THE ALUMNI COUNCIL AT [ALUMNI.HMS.HARVARD.EDU/ELECTION](https://alumni.hms.harvard.edu/election).

➔ This past spring, Harvard Medical School graduates elected four new members to the Alumni Council. Three of the new members are representing the Second (classes of 2011-15), Fifth (1996-2000), and Ninth (1976-80) pentads, respectively: Jessica Ann Hohman, MD '13 (Class of 2012), medical director of the Cleveland Clinic’s Medicare Accountable Care Organization and a physician investigator in the clinic’s Center for Value-Based Care Research; Sitaram “Ram” M. Emani, MD '97, senior associate of cardiovascular surgery at Boston Children’s Hospital; and Nancy Q. Petersmeyer, MD '80, assistant professor of psychiatry at Uniformed

Services University. The fourth new member, John F. Cramer III, AB '70, MD '74, professor emeritus at the University of Washington, is representing all classes as councilor-at-large.

The Alumni Council promotes and supports activities that connect alumni to each other, the School, and current students. In addition, its members, who are elected to three-year terms, serve in a consultative and advisory role to HMS leaders.

FROM LEFT: JESSICA ANN HOHMAN, SITARAM “RAM” M. EMANI, NANCY Q. PETERSMEYER, AND JOHN F. CRAMER III



# STRIVING TO MAKE STEM CAREERS POSSIBLE FOR ALL STUDENTS

➔ Harvard Medical School's MEDscience program has been resolute in its pursuit of one goal: to eliminate the barriers that prevent diverse and talented students from entering STEM professions. While the program's approach has changed over the years—formerly a summer immersion experience, it is now offered as a credit-bearing, semester-long course for high school students or as customizable “mini-course modules” to fit a school's needs—its aim to serve underrepresented learners in the field of medicine has remained constant.

MEDscience challenges students to respond to simulated medical emergencies, requiring them to think critically, communicate effectively, and work collaboratively. Students are also introduced to a wide network of medical professionals, including physicians, nurses, and emergency medical technicians, who expose them to an array of potential science, technology, engineering, and math careers.

**“JULIE AND HER TEAM HAVE BUILT A COMPELLING NEW EDUCATIONAL MODEL CONSTRUCTED WITH THEIR COMMITMENT TO STEM, THEIR MISSION OF EQUITY, THEIR LOVE OF THEIR STUDENTS, AND THEIR PASSION FOR INNOVATIVE EDUCATION.”**

STEPHANIE ROGERS

MEDscience's delivery model shifted when the COVID-19 pandemic shut down in-person learning. Program leaders quickly transformed the curriculum to accommodate remote learners, extending the program's reach to schools that hadn't been able to send their students into Boston. The Paul & Phyllis Fireman Charitable Foundation recently gave \$750,000 to further expand access to this innovative experiential learning program.

HMS MEDscience has grown from serving a single public school of 12 students in 2008 to serving more than 60 schools and 2,000 students today.

“The ability to serve more students is a game-changer,” says MEDscience's executive director, Julie Joyal, EdM '08. “This funding will allow us to build our capacity to meet the increased demands of our program. It has enabled us to hire new staff and to continue diversity and inclusion training. These actions align perfectly with our mission to create transformational change in underserved communities.”

Fireman Charitable Foundation President Stephanie Rogers has seen firsthand how MEDscience can impact students, as both of her children participated in the program. Rogers gives MEDscience all of the credit for her kids' interest in science and medicine and praises the hands-on experience—down to the HMS-issued scrubs—that brought concepts to life better than a traditional classroom model.

MEDscience alumnus Justin Owumi, MD, who graduated from Tufts University School of Medicine last year, echoes that praise. “MEDscience was the one place I could participate in hands-on experiences that were clinically related,” he says. “Having a patient and working through the problem and then being able to diagnose the patient really boosts your confidence.”

Owumi, who serves on the MEDscience board and is a volunteer for the program, is now in the second year of his general surgery residency at Banner – University Medical Center Phoenix. “It was truly incredible to be surrounded by members in the medical community who were so encouraging and truly validated me in my ability to become a physician, something I wasn't so sure of before,” he says.

Rogers wants everyone to have the opportunity to experience what Owumi describes. “It is such an extraordinary, life-altering program,” she says. “Julie and her team have built a compelling new educational model constructed with their commitment to STEM, their mission of equity, their love of their students, and their passion for innovative education. We're honored to support them in expanding access to MEDscience throughout Greater Boston.”

**MEDSCIENCE PROGRAM DIRECTOR LIVIA RIZZO TALKS WITH HIGH SCHOOL STUDENTS FOLLOWING THEIR DIAGNOSIS OF A PATIENT WITH FLUID IN HER LUNGS.**



VISIT [HMSMEDSCIENCE.ORG](https://hmsmedscience.org) TO LEARN MORE ABOUT THIS INNOVATIVE PROGRAM.





# COLLABORATING TO COMBAT DECLINE IN COGNITIVE SKILLS

➔ Many adults experience memory loss and struggle to learn new skills as they get older—two frustrating realities of aging that scientists are working tirelessly to better understand. Yet, the abundance of research on age-related diseases like Alzheimer’s has so far revealed surprisingly little about how the human brain changes during the normal aging process. As a result, there are currently no reliable therapies to minimize cognitive decline and extend a healthy life span.

To address this knowledge gap, the Simons Foundation has awarded grants totaling \$2,250,000 to three principal investigators in the Blavatnik Institute at Harvard Medical School. The grants are part of the Simons Collaboration on Plasticity and the Aging Brain (SCPAB), which aims to understand the changes in the brain during aging and how those changes contribute to poorer memory and declines in other cognitive abilities. Each researcher will receive \$750,000 to participate in collaborations spanning multiple labs and institutions.

Working together with two other labs, Sandeep Robert “Bob” Datta, MD ’04, PhD ’04, a professor of neurobiology, and Bernardo L. Sabatini, SB ’91, MD ’99, PhD ’99, the Alice and Rodman W. Moorhead III Professor of Neurobiology, will create a mouse research paradigm to study the decline of brain plasticity during aging. “Each lab brings unique research expertise, methodologies, and systems to our effort. The brain is so complicated, and the changes in aging are so profound, that it is not possible for one lab to tackle this alone,” says Sabatini. One of the collaborating labs is led by Beth Stevens, PhD, an HMS associate professor of neurology at Boston Children’s Hospital, while the other is based at the University of California, Los Angeles.



BERNARDO SABATINI

Roughly 10% of Americans age 65 and older will develop Alzheimer’s disease, but the other 90% of the population will experience a notable decline in cognitive functions like memory and attention, according to the Simons Foundation.

“OUR WORK IS HIGH-RISK, HIGH-REWARD—WE ARE INVENTING TOOLS TO MEASURE ANIMAL BEHAVIOR AS WE GO—SO HAVING RELATIVELY FLEXIBLE FUNDING IS TRULY ENABLING.”

SANDEEP ROBERT DATTA

The group will use cutting-edge machine vision and machine learning techniques to create an atlas of mouse behavior across the life span. According to Datta, scientists want to understand the underlying changes in the brain that correspond to the systemic behavioral changes and declines in learning potential observed during typical aging. “Our work is high-risk, high-reward—we are inventing tools to measure animal behavior as we go—so having relatively flexible funding is truly enabling,” Datta says.

As part of a collaboration spanning eight labs and research institutions across the U.S.—including the aforementioned Stevens Lab at BCH—Steven A. McCarroll, PhD, the Dorothy and Milton Flier Professor of Biomedical Science and Genetics, will study hundreds of postmortem brain tissue specimens from adults ranging in age from 25 to 98. The goal is to identify how each cell type in the human brain changes with advancing age. To do this, the lab will analyze gene expression at a single-cell resolution over hundreds of thousands of cells.

McCarroll says: “To truly understand human cognitive aging, we need to look at an enormous number of humans to see patterns emerge. Projects with this scope are typically prohibitively expensive, so we are very appreciative to be able to engage this question with the kind of sample size that the problem needs.”



SANDEEP ROBERT DATTA



STEVEN MCCARROLL

# IN BRIEF

The following faculty-generated gifts and grants totaling \$250,000 or more were awarded by organizations to support members of the Harvard Medical School community in their work to alleviate suffering and improve health and well-being for all.

Five scientists in the Blavatnik Institute at HMS will pursue scientific inquiries to advance the field of cardiac research, thanks to more than \$600,000 in grant funding from the **American Heart Association**.



Urmimala Basu, PhD (top), a research fellow in biological chemistry and molecular pharmacology, will explore the novel roles of mRNA capping



enzymes in transcribing DNA information into RNA. Kerui Huang, PhD (left), a research fellow in genetics, will study fatty liver disease to better understand how the disease impacts fat distribution in

other organs, especially the heart. Rudolf Pisa, PhD (bottom), a research fellow in cell biology, will investigate how cells correctly identify and destroy damaged proteins to maintain homeostasis, which is critical for cardiac tissue health. Gabriela V. Silva, PhD, a research fellow in genetics, will study antibody responses to Chagas disease infection to identify indicators of infections that may progress to severe heart disease. Chi Jie Matthew Yip, a PhD student in the Department of Cell Biology, was awarded a predoctoral fellowship to characterize the function of the enzyme UBE20, which is responsible for cleaning up excess protein building blocks that would otherwise accumulate and cause disease in the heart.



**Bruker Nano Inc.** has given a \$600,000 grant to Chao-Ting Wu, AB '77, PhD '85, a professor of genetics in the Blavatnik Institute at HMS, to support Wu's efforts in developing technology to visualize and study the 3D organization of the genome.

Three postdoctoral fellows in the Blavatnik Institute at HMS have received a total of \$562,000 in grants from the **Damon Runyon Cancer Research Foundation** to advance cancer research. Karole D'Orazio, PhD, a research fellow in cell biology, will continue her career-long pursuit of understanding the fundamental cellular pathways that go awry during carcinogenesis. Hannah Grunwald, PhD, a research fellow in genetics, will study how genetic variation is disguised in fish to deepen our understanding of how genotypes are related to phenotypes. This may help scientists understand

how genetic diseases are inherited. Natasha O'Brien, PhD, a research fellow in systems biology, has received the Dale F. Frey Award for Breakthrough Scientists, which recognizes Damon Runyon Fellows who have greatly exceeded the foundation's highest expectations. She will continue her research to better understand the blood-brain barrier and possible therapeutic targets for brain cancer treatment.

## Cure Alzheimer's Fund

recently awarded a second \$500,000 grant to Sandeep Robert "Bob" Datta, MD '04, PhD '04, a professor of neurobiology in the Blavatnik Institute at HMS. Datta will expand his research into a set of genes that impact the occurrence of Alzheimer's disease.



The **Howard Hughes Medical Institute** is supporting two scientists in the Blavatnik Institute at HMS with grants totaling \$450,000. Ava C. Carter, AB '13, PhD, a research fellow in neurobiology, will explore how early postnatal experiences impact human brain development. Morgan S. A. Gilman, PhD, a research fellow in biological chemistry and molecular pharmacology, is studying a molecular mechanism of bacterial cell wall synthesis to identify new antibiotic targets.



Two research fellows in the Blavatnik Institute at HMS received a total of \$422,312 in grants from the **Human Frontier Science Program**.

Dana R. Levy, PhD (left), a research fellow in neurobiology, will study the

role of the striatum in development to understand if early-life behavioral patterns can predict behaviors in adulthood. Meng Zhu, PhD (right), a research fellow in genetics, will explore the timing of gene expression in mouse limb development to advance the understanding of human limb defects.



The **Warren Alpert Foundation** is supporting research by Sara Prescott, PhD, a research fellow in cell biology in the Blavatnik Institute at HMS, with a \$400,000 grant to better understand how cells in the mammalian airway lining communicate and protect against infection.



Geylani Can, PhD, a research fellow in biological chemistry and molecular pharmacology in the Blavatnik Institute at HMS, has been awarded \$375,832 in grant funding by

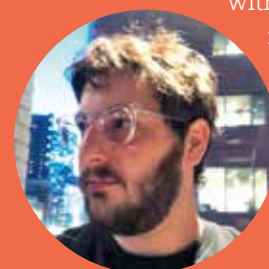
**Cancer Research UK (CRUK)** to take part in the American Association for Cancer Research-CRUK Transatlantic Fellowship, which provides high-potential postdoctoral researchers with support to pursue their projects both in the U.K. and the U.S. Can will be studying the regulation of DNA replication during mitosis at both HMS and the Francis Crick Institute in London. Cancer Research UK is the world's largest charitable funder of cancer research.

## The Jane Coffin Childs Memorial Fund for Medical Research

has awarded two scientists in the Blavatnik Institute at HMS with a total of \$362,000 in grant funding. Paula J. Bucko, PhD (right), a research fellow in systems biology, will study how levels of the tumor suppressor protein p53 in cancer cells correlate with anti-tumor immune cell



functions. Caleb S. Weinreb, PhD '19 (left), a research fellow in neurobiology, will investigate the role of the medial prefrontal cortex in processing and responding to social information.



The **Louis E. Wolfson Foundation**, a steadfast supporter of MD students at HMS, has given \$350,000 to provide students who demonstrate financial need with access to low-interest institutional loans. This is the foundation's 36th consecutive year of support, and its contributions now total more than \$11.7 million.





# Q&A WITH BRUCE YANKNER

We sat down with Bruce A. Yankner, MD, PhD, a professor of genetics and neurology in the Blavatnik Institute at Harvard Medical School and co-director of the Paul F. Glenn Center for Biology of Aging Research at HMS, to talk about aging research, a focus of several projects described in this issue of Pulse.

**01**  
Based on the science, what is the most effective way for people to extend the healthy years of life, or so-called health span?

Probably the most beneficial approach to aging is the one that gets the least airtime. The longest study of human aging is the Harvard Study of Adult Development, which examined factors that predict successful aging in a group of 268 Harvard College juniors from the classes of 1939-1944, which included John F. Kennedy and Ben Bradlee. The study subsequently added a group of 480 inner-city Bostonians to determine the effect of different socioeconomic status. The single most predictive variable for successful aging in the entire group, defined by absence of age-related diseases and preservation of memory, was satisfaction with your spouse in middle age. A second highly predictive factor was the number of friendships and close family relationships. These factors were more important than money or career success. They were more important than blood pressure or blood lipid levels. This dramatic result emphasizes the importance of mental health during aging.

**02**  
Have there been any surprising research findings in the past decade or two that have shifted our understanding of the biology of human aging?

A major conceptual advance over the past two to three decades has been the recognition that aging is not immutable. Rather, it is a modifiable biological change subject to genetic and environmental influences—and potentially therapeutic intervention. Insulin/IGF signaling was the first pathway shown to regulate the aging process in laboratory worm models. This pathway was subsequently shown to regulate aging from invertebrates to mammals, and it could be modulated to extend healthy life span. During this time a second centrally important regulator of aging was discovered—the mTOR pathway—which mediates the integration of diet and growth. These fundamental signaling pathways have provided aging research with basic principles, transforming it from phenomenological observation to mechanism-based science.

**03**  
How have technical advances changed the field of aging research? Can you give an example of a recent breakthrough that would not have been possible without a newly developed technique or tool?

The discovery of induced pluripotent stem (iPS) cells by Shinya Yamanaka, who was awarded the Nobel Prize in Physiology or Medicine in 2012, enabled the modeling of age-related diseases in human cells. Prior to this advance, human diseases were typically modeled in mice. The advent of iPS cells, however, enabled us to model age-related diseases using the appropriate human cell types. This approach advanced our understanding of Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS), diabetes, heart disease, and cancer. Remarkably, iPS cell models could recapitulate aspects of age-related diseases under the right genetic and environmental conditions, effectively bypassing the 70 years needed to reach that point in a patient.

## CALENDAR

Please note that we have removed the calendar section from this issue of Pulse as a result of the COVID-19 pandemic and its potential impact on upcoming events.

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CELEBRATING THE HEART AND IMPACT OF THE HMS COMMUNITY

# PULSE

FALL 21

## CELEBRATING NEW STUDENTS—IN PERSON

Members of the Harvard Medical School and Harvard School of Dental Medicine Class of 2025 arrived on campus in early August for a week of welcome events, the first formal in-person gatherings on the HMS campus since the beginning of the coronavirus pandemic in March 2020. First-year student classes were conducted with layers of public health protections, and the traditional white coat ceremony (pictured) restricted attendance. Members of the Class of 2024 also received the in-person ceremony they missed last year due to the pandemic.

**Read more, see additional photos, and find links to videos of both white coat ceremonies at [tinyurl.com/HMS-welcome-21](https://tinyurl.com/HMS-welcome-21).**

