

LET'S TALK ABOUT IT

Texas Tech's Hayhoe Kicks Off Sustainability Speaker Series

BY AMBER SNYDER

The first step in addressing any problem is talking about it. That's especially true for climate change. And who better to start the conversation than Dr. Katharine Hayhoe?

An accomplished climate communicator who has made appearances everywhere from Jimmy Kimmel to the White House, Hayhoe is an atmospheric scientist and author. She is chief scientist for The Nature Conservancy and a Paul Whitfield Horn distinguished professor and the political science endowed chair in public policy and public law in the department of political science at Texas Tech University.

She spoke recently as part of a new series for federal employees hosted by the Office of the Federal Chief Sustainability Officer within the White House Council on Environmental Quality.

Seventy percent of Americans are concerned about climate change, according to a 2020 survey from Yale; and half of all Americans feel hopeless and don't know



Dr. Katharine Hayhoe

where to start. Climate change "dismissives" are a shrinking minority—only about 8 percent of respondents in the Yale study. Hayhoe highlighted a different statistic: Only 33 percent of Americans discuss climate change regularly.

Talking about climate change is the first step in generating action, she said. "We talk about [it] because it affects every aspect of what humans need to survive and thrive on this planet."

People have been studying the Earth's climate for more than 200 years. French scientist Joseph Fourier discovered what we now know as the greenhouse effect (how the Earth's atmosphere traps heat) in the 1820s and British engineer Guy Callendar was the first to prove that atmospheric carbon dioxide was warming the Earth back in 1938.

Over the course of human civilization, Hayhoe said, the Earth's global temperature was as steady as the human body's,

SEE **SUSTAINABILITY**, PAGE 4

INJECTABLES FOR HEALING

Bioengineer Develops Ways to Repair, Regenerate Tissue

BY DANA TALESNIK

Dr. Karen Christman went into bioengineering to find novel ways to help patients, and she's getting ever closer to that goal. While the therapies her lab developed are in preclinical or early-phase clinical testing, studies so far show hopeful results.



Dr. Karen Christman

Christman's lab at the Sanford Consortium for Regenerative Medicine in San Diego works with different types of

SEE **CHRISTMAN**, PAGE 6

CLOAKED CRISIS

Promoting Mental Health in Native American Communities

BY DANA TALESNIK

"Yá'át'ééh!" exclaimed Dr. Glorinda Segay, uttering a Navajo greeting to open her talk.

Speaking at a recent NIMH Director's Innovation Series lecture, Segay discussed her efforts to improve mental health services for American Indians and Alaska Natives.

As a therapist born and raised on a Navajo Reservation in Blue Canyon, Ariz., Segay is keenly aware of the unique needs of assisting these communities in culturally sensitive ways. As director of the Division of Behavioral Health



Dr. Glorinda Segay



Local leaders dedicate MD 355 tunnel that connects NIH and Walter Reed. See story, p. 12.

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Keep an Eye Out for Early PIV Card Renewal

Is your NIH badge set to expire soon? You could be one of about 5,000 employees whose PIV cards are set to expire this year; nearly quadruple that number are slated to expire in 2023, which will far outstrip capacity for processing in a single year.

To alleviate the burden of this predicted surge, the Division of Personnel Security and Access Control (DPSAC) has begun early, or “forced,” renewals of thousands of NIH PIV badges that would normally expire next year.

If your PIV card is set to expire in 2023, look out for an email when it's your turn to renew your badge early. Newly issued PIVs will have a new 5-year expiration date.

DPSAC has been processing 250 forced renewals weekly since November 2021 and plans to continue through 2023.

By accelerating the renewal process, DPSAC can even out the load over a longer period while addressing the badging needs of new hires, fellows and interns.

This surge in renewals is a result of the normal 5-year renewal cycle for badges issued in 2018 and



Check your PIV card expiration date; you may be contacted to renew early to avoid the rush.

Collins Named Acting Science Advisor to President Biden

Less than 2 months after stepping down as NIH director, Dr. Francis Collins was formally announced Feb. 16 by the White House as acting science advisor to President Biden.

“I’m honored to be asked to do this,” Collins said, in an interview with NBC’s Chuck Todd. “It wasn’t part of my life plan, but I do think public service is a privilege. It gives your life the kind of meaning that almost nothing else can. We’re all looking for that, aren’t we?”

Collins’s new chapter essentially involves oversight of four main goals: help find the next director of NIH, get the proposed Advanced Research Project Agency for Health (ARPA-H) over the finish line; assist in fleshing out the next phase of the Cancer Moonshot and co-chair (with Dr. Frances Arnold and Dr. Maria Zuber) the President’s Council of Advisors on Science and Technology (PCAST).

The science advisor post along with the Cabinet-level directorship of the White House Office of Science and Technology Policy (OSTP) became vacant with the sudden resignation of Dr. Eric Lander. Both jobs are often held by one individual, but permanent appointment requires Presidential nomination and Senate confirmation. In the interim, OSTP deputy director Dr. Alondra Nelson will perform the duties of OSTP director. Collins and Nelson will work closely together to be sure this transition is as seamless as possible.



President Joe Biden fistbumps Dr. Francis Collins last December when he visited NIH. On Feb. 16, the White House announced that Collins will serve as the president’s acting science advisor.

4-year renewal for badges issued in 2019, which have doubled the usual expiration volume.

Questions about the process? Email ORSPersonnelSecurity@mail.nih.gov.

Virtual ‘Take Your Child to Work Day’ Returns Apr. 28

NIH’s 28th annual ‘Take Your Child to Work Day’

returns virtual Thursday, Apr. 28 from 9 a.m. to 4 p.m. ET. Join a day of discovery as our children learn about what we do, but also get interested in science, technology, administrative and program support. The event will provide children grades 1-12 an opportunity to experience the diversity of research and careers that makes NIH what it is.

More than 20 institutes, centers and offices have expanded the engaging virtual activities offered last year and will offer a few new activities to all NIH locations. Live and recorded events will be available throughout the day in addition to Earth Day activities. Interpreting services and/or other reasonable accommodation to participate will be provided.

Mark your calendars and be on the lookout for emails announcing the key registration Tuesdays:

- Mar. 22, 9 a.m.: **Pre-registration** (Site opens to enter child/ren’s information and preview activities ONLY).
- Mar. 29, noon: **Registration phase 1** (Register child/ren for up to 2 limited-space activities each).
- Apr. 5, noon: **Registration phase 2** (Register child/ren for up to 2 additional limited-space activities for a maximum of 4 limited-space activities).

Volunteer opportunities will also be available for students in grades 9-12 to help with virtual activities. For details, visit: <https://takeyourchildtowork.nih.gov/Pages/default.aspx>. Email questions and comments to Take-Your-Child-To-Work@nih.gov. The Office of Research Services is the primary sponsor of TYCTWD 2022.

VOLUNTEERS

CAR-T Study Recruits

NCI is looking for clinical trial participants with Glypican-3 positive HHC, a type of liver cancer, to receive an experimental therapy of genetically modified CAR-T cells. Study treatment consists of a preparative regimen with standard chemotherapy drugs fludarabine and cyclophosphamide and CAR-T cell infusion. Researchers want to see if this treatment can help people with a certain type of liver cancer. NIH will cover study-related costs for medical care, travel and housing. For more information on specific criteria, visit <https://go.usa.gov/xtErY> or call (866) 444-2214 and refer to study #21-C-0030.

Volunteers Needed for Testing

Are you willing to undergo testing for research? By giving a little of yourself, you will be helping researchers in the neuroimmunology diseases section at NIH with discoveries in diagnosing and treating multiple sclerosis and other neurodegenerative diseases. This study will compare tests performed on healthy volunteers and individuals who have signs or symptoms of immune-related damage to their brain and spine. There is no cost to participate and compensation may be provided. Interested? Contact the Clinical Center Office of Patient Recruitment at (866) 444-2214 (TTY dial 711) or ccopr@nih.gov. Refer to study #09-I-0032. View online details: <https://go.usa.gov/xerUR>.



Early morning at NIH. The grounds behind Bldg. 60 on the main campus look quiet and serene at around 7 a.m. recently, but some folks have missed the hustle and bustle of a pre-pandemic NIH campus. The majority of the workforce begins to trickle back on site gradually later this month, as 2 years of maximum telework ends across government agencies.

PHOTO: MICHELE LYONS

MIXED EMOTIONS

Readers Share Feelings of Anticipation, Concern About Returning on Site

Most employees will be due back on site for a few days per pay period by Apr. 10. In preparation for the “Big Return” to the physical workplace, the *NIH Record* asked readers to tell us how they’re feeling about easing back into a new normal business flow. Here are the first few responses (many of them submitted anonymously), which reflect myriad emotions, from excitement to anxiety.

I’m so excited that I won’t be the only person in my building! Well, the guards come in to warm up and eat, but it sure will be nice to see people throughout the day. Especially my co-workers—I look forward to eating lunch with them in person, instead of on Zoom.—Michele Lyons, associate director and curator, Office of NIH History and Stetten Museum

I am worried about the traffic in my commute to the office! It was so nice to have 3 hours of my day back. Also, due to teleworking and mask-wearing, I have not had a cold for 2 years. I am worried about what will happen when we are back in the office.—anonymous

Can’t wait to walk to the metro again and get to my new office on the main campus in Bethesda! Can’t wait to see my colleagues in person for the first time ever, as I was hired during the pandemic. And last but definitely not least, looking forward to separating work and home again: the impact of never



PHOTO: SHUTTERSTOCK/ PEARL PHOTOPIX

being able to leave work behind has been significantly impacting both mental health and family life.—anonymous

I love working for NIH but do not want to come back to campus with Covid still so predominant. I have not had Covid and do not want to. We do not know who will be a long-hauler or whose heart, lungs, kidneys or brain will be affected for life. Please let me work from home! We have clearly demonstrated it can be done.—anonymous

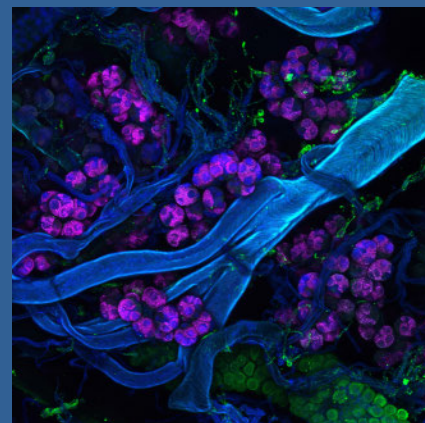
Returning to the workplace is unsettling for many staff. It is mostly appealing to those who have offices and aren’t required to sit in their masks for 9+ hours a day. If everyone was required to wear a mask, including those with offices in their offices, they would not be as enthusiastic and would likely be more reluctant to return. While most federal employees/contractors are vaccinated, that doesn’t factor in the possible transmission of Covid from staff who are in contact with unvaccinated people either in their homes or on mass transit to family members at home who are immunocompromised or ineligible to be vaccinated.—Ericka Thomas, OD

I have been successfully teleworking full-time for 2 years at this point and see no reason why I should be required to be on campus a minimum of 2 days per pay period. 95 percent of my job can be done from home—I’ve been to campus for work-related reasons maybe 15 times over the past 700+ days. Why not just allow people like me to go to campus when they need to instead of just for an arbitrary amount of time? I suspect I’m not the only person who sees the return to the physical workspace as simply defaulting to the previous status quo. I wish HHS/NIH leadership

would more carefully consider whether and when someone actually needs to be in their physical office.—anonymous

The *Record* will continue to share the responses we receive, as employees begin returning. To contribute your insights, email nihrecord@nih.gov or visit nihrecord.nih.gov/ and click **FEEDBACK** to send comments anonymously.

For the latest resources and policies on returning to work in person, visit: <https://employees.nih.gov/pages/coronavirus/return-physical-workspaces-guidance.aspx>. **R**



ON THE COVER: *Tissue dissected from a female Rocky Mountain wood tick collected at Lake Como, Mont, featuring many acini (magenta and blue) of the salivary glands that produce proteins to facilitate blood feeding.*

IMAGE: ADAM NOCK, JACQUELINE LEUNG, ELIZABETH FISCHER AND TED HACKSTADT (ROCKY MOUNTAIN LABORATORIES, NIAID)

The NIH Record

Since 1949, the *NIH Record* has been published biweekly by the Editorial Operations Branch, Office of Communications and Public Liaison, National Institutes of Health, Department of Health and Human Services. For editorial policies, email nihrecord@nih.gov.

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Sustainability

CONTINUED FROM PAGE 1

fluctuating by no more than a few tenths of a degree over decades to centuries. Until the last 100 years, that is. Now, the increase in global temperature has reached the equivalent of a fever.

The power of fossil fuels has allowed for incredible advances in human society, but not without cost.

“As far back as we can go in the history of this planet, we have never seen this much carbon going into the atmosphere this quickly,” Hayhoe said. “We are truly conducting an unprecedented experiment with the only home that we have.”

The global temperature is currently 1 degree Celsius (almost 2 degrees Fahrenheit) warmer than it would be without the impact of heat-trapping greenhouse gas emissions from human activities. That may not seem like a lot, but it is already wreaking havoc on weather patterns.

Some locations near Houston, for example, have had 3 “500-year flood events” in 3 years. The recent bushfires in Australia, flooding in Germany, last year’s heat wave in the Pacific Northwest—climate change made all of them more likely and more intense.

★ ★ ★

“There’s no one you can’t connect climate change to, if you stop and take the time to figure out what they love, where they love and who they love.”

—DR. KATHARINE HAYHOE

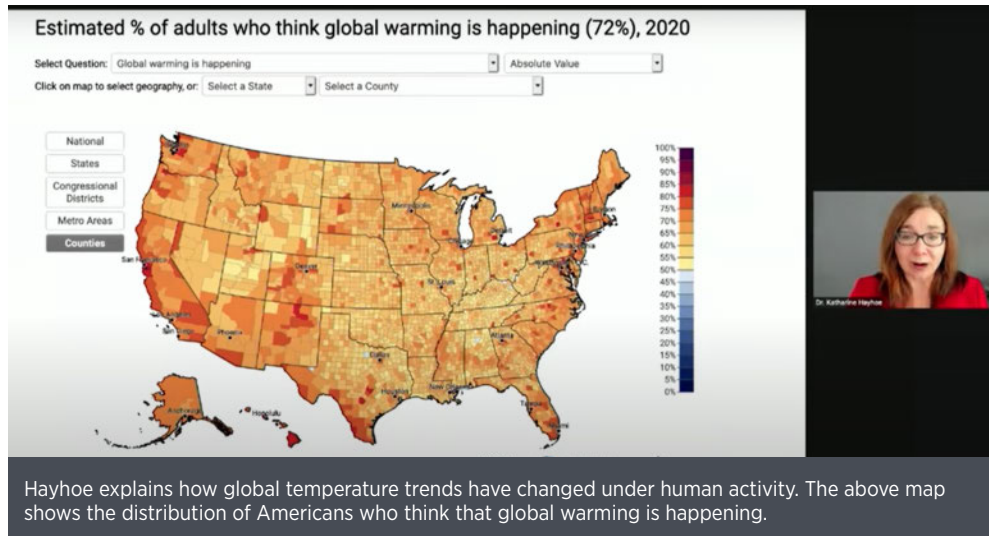
★ ★ ★

Burning fossil fuels produces air pollution as well as greenhouse gases; air pollution is responsible for at least 9 million deaths every year.

So, if we know climate change exists and the majority of Americans are concerned about it, why aren’t we acting at speed to fix it?

“It’s because we aren’t talking about it!” Hayhoe exclaimed. People experience a phenomenon called “psychological distance,” in which they acknowledge that a risk exists but don’t think it will happen to them.

In the 2020 Yale climate study, only 43 percent of those surveyed said that climate change will affect them personally. But it’s likely that climate change is already affecting



us, wherever we are in the world.

Washington, D.C., for example, has seen an uptick in extreme heat over the past century. In the early 1900s it averaged 25 days of 90 degrees F or warmer. That number has almost doubled and is now 49 days as of 2020.

Hayhoe shared that she was recently in Iowa and was asked how to get people there to talk about things like polar bears and ice caps. “You don’t,” she responded. “You talk about corn.”

carbon emissions that we are personally responsible for (such as driving a car). Hayhoe prefers the term “climate shadow,” which was coined by journalist Emma Pattee. A climate shadow describes how we influence others and model change.

One institution that has a large shadow, in terms of its influence, is the federal government. And the Federal Sustainability Plan has “one heck of a climate shadow,” according to Hayhoe.

The U.S. government has 300,000 buildings, 600,000 cars and trucks and annual purchasing power of \$650 billion in goods and services. The new plan sets out five ambitious goals that will reduce emissions by federal operations, invest in clean energy and help communities become clean, resilient and healthy.

Federal Chief Sustainability Officer Andrew Mayock, who was also on the call, said that many federal agencies are ahead of these goals. NIH is proud to fall into that category, with 100 percent electric vehicle acquisitions for fiscal year 2022. The NIH Police Department also has 6 new electric motorcycles to offset emissions from the other vehicles in their fleet.

Working under previous presidential administrations focused on alternative fuel sources, NIH has already reduced its gas-powered vehicles to a mere 15 percent of its fleet. NIH currently has 9 electric vehicles and 2 charging stations on the Bethesda campus; 1 of the charging stations is offset by solar power. The National Institute of Environmental Health Sciences in North Carolina will be receiving NIH’s first electric 24-ft. box truck.

“There’s no one you can’t connect climate change to, if you stop and take the time to figure out what they love, where they love and who they love,” she continued. You can make more of an impact if you talk about climate change on the local level such as unseasonable weather patterns, urban flooding, air pollution, etc.

Once you get people talking, the next step is to get them “activated,” Hayhoe said. Talk about what is already being done in their community and “[show] people how they can add their hand to that giant boulder and get it rolling down the hill even faster.”

Many people have probably heard the term “carbon footprint,” which are the

NIH also provides incentives for employees to commute more sustainably, such as the Transshare Program for mass transit, free carpool and vanpool matching services, the NIH Bicycle Commuter Club, campus shuttles and the Electronic Vehicle Pilot Program.

We need systemic change to tackle climate change, Hayhoe said, but a system is

also made of individuals. “We need to change the system so that the best choice is also the most affordable choice for everyone, [and we] need individuals because our voices are what change that system.”

Hayhoe admitted that a great deal of work lies ahead of us, but she remains optimistic. “We can’t go it alone, but together I really, truly believe we can do this.”

The next installment in the Sustainability Series will feature science educator Bill Nye. Visit <https://www.sustainability.gov/index.html> for more information and to view this archived lecture.

For more NIH commuter information, visit <https://wellnessatnih.ors.od.nih.gov/worklife/Pages/NIH-Commuter-Information.aspx>. **R**

Ethical Issues Emerge in Gene-Environment Interactions Research

BY JENNIFER HARKER

Ethical, legal and social implications (ELSI) of researching how the environment interacts with human genetics were the subject of a virtual workshop cosponsored recently by NIEHS and NHGRI.

The purpose of the meeting was to discuss ELSI issues that will require greater attention as gene-environment interactions research expands, noted Dr. Dave Kaufman, a program director in NHGRI’s Division of Genomics and Society. He and Dr. Kimberly McAllister, a health scientist administrator in NIEHS’s Genes, Environment and Health Branch, organized and moderated the event.

ELSI topics discussed included collection, analysis and sharing of environmental and genomic research data; unique concerns of vulnerable populations disproportionately affected by environmental exposures; and potential legal and privacy issues that arise when individuals’ identities are linked to genomic and exposure data.

‘Increasingly Complex, Multifaceted’

“Our work is complicated,” said Dr. Rick Woychik, director of NIEHS and the National Toxicology Program. He noted that the environment includes not just chemicals and pollutants but also lifestyle factors, psychosocial stress, racism and socioeconomic disparities.

“We are interested in evaluating how all of these environmental exposures impact human health,” Woychik added.

Gene-environment interactions research promises better understanding of why individuals experience different biological responses to exposures, but such inquiry demands careful attention to issues that often go beyond the bench, according to Woychik.

“The ethical, legal and social issues related to gene-by-environment interactions research—and the implications of this research—are increasingly complex and multifaceted,” he said.

That sentiment was echoed by NHGRI director Dr.

Eric Green, whose institute emphasizes responsible data stewardship and consideration of ELSI.

“It’s an opportune time with respect to the science and exciting technological advances that might provide us [with] more robust approaches for dissecting the interactions of genetic influences and environmental influences,” he said. “We know that we must incorporate the environmental factors that lie on the same causal pathways as genomic determinants, and we have

learned that as genomics grows, new issues and implications arise.”

Sharing Findings, Diversifying Research

Gene-environment interactions research relies on individual- and community-level information about genetic characteristics and environmental exposures. That has led to calls for increased communication of findings with study participants.

“This has created new responsibilities for researchers to report back to people to help them use this information to learn about their environmental health risks and have the opportunity to modify [environmental] exposures,” said Dr. Julia Brody, executive director and senior scientist at Silent Spring Institute.

The need for greater diversity in study participant pools also was a major topic at the workshop.

Dr. Karriem Watson, chief

engagement officer for the All of Us Research Program, noted that the initiative is collecting health, environmental and genomic information of a million or more U.S. residents, with a specific focus on diversity, equity and inclusion.

“It is so important for us to think about the fact that we are building one of the nation’s largest cohort studies,” Watson said. “Early on, we wanted our participants to reflect the diversity of the U.S., and we have been intentional to engage stakeholders as partners to ensure community-engaged principles of ethical inclusion.”

Confidentiality, Discrimination Concerns

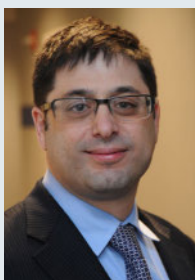
Anya Prince, a law professor at the University of Iowa, expressed concern about how definitions and current legal protections regarding genetic information vary from state to state.

The 2008 Genetic Information Nondiscrimination Act is a federal law that protects privacy concerning genetic information. However, state laws are not uniform and definitions differ.

In addition, private companies are rapidly collecting data on consumers, which creates a new set of future ELSI concerns, such as how information could be used in discriminatory ways, according to Prince.

“[Gene-environment] interactions research is broadening the scope of what we’re learning about, and until we limit what somebody can collect about us, the sky’s the limit on discrimination and privacy violations,” she said.

Kaufman noted that going forward, gene-environment interactions research will require balancing the interests of scientists and study participants; consideration of the time and resources necessary for community-based methods that build research based on stakeholder input; and incorporation of hypotheses that consider social determinants of health.



Dr. Dave Kaufman (l) manages ELSI research grants. PHOTO: NHGRI
Dr. Kimberly McAllister manages grants in genetic epidemiology and gene-environment interactions studies. PHOTO: STEVE MCCA/W/NIEHS



NHGRI director Dr. Eric Green (l) said that as gene-environment interactions research continues to grow, greater attention to ELSI will be necessary.

PHOTO: NHGRI

Dr. Karriem Watson noted that race, ethnicity, age, education, income and sexual and gender status are diversely represented in the All of Us Research Program.



Christman

CONTINUED FROM PAGE 1

biomaterials—both naturally derived and synthetic hydrogels—as well as nanoparticles to repair and regenerate tissue toward treating cardiovascular and other conditions. She discussed her research at a recent virtual meeting of NIH’s biomedical engineering scientific interest group.

“Almost everything we do really is geared to developing minimally invasive therapies, [ones] that don’t require surgery and can be delivered either through intravenous injection, intramuscular injection or, in the case of the heart, via catheter,” said Christman, a professor of bioengineering at the University of California San Diego. Such modes of delivery, she said, mean less recovery time for the patient.

Healing the Heart

“We think a lot about how we can use biomaterials to create new environments in the heart that will stimulate healing,” said Christman.

Myocardial infarction (MI or heart attack) remains a leading cause of death around the world. Of those who survive, many experience negative left ventricular remodeling and don’t recover full cardiac function. There are no therapies that prevent this process, which leads to reduced pumping capacity and ultimately end-stage heart failure. Current treatment options for end-stage heart failure, such as heart transplants or left ventricular assist devices, are invasive and have other downsides.

In acute MI, cardiac inflammation degrades the extracellular matrix (ECM)—the body’s natural scaffold, or microenvironment for cells—which over time gets replaced with a dense collagen scar. Rather than infuse cells into such an abnormal environment that has diseased cues, Christman’s approach tries to recreate a more normal environment where cells can heal the heart.

“You can think of it as trying to create a healing

wound inside of the heart as opposed to a chronic and inflammatory scar,” she said.

One of the first technologies her lab developed was an injectable myocardial matrix hydrogel derived from cardiac tissue from pigs. A catheter with a retractable needle delivers the hydrogel directly into the heart.

In animal models, injecting the hydrogel after MI affected multiple dysregulated pathways and showed increases in cardiac muscle, signs of new muscle formation and improved cardiac function.

This research led to a small phase-1 safety trial of the VentriGel injected into 15 patients between 2 months and 3 years after MI.

“The safety results alone were very exciting because—at least to our knowledge, while [there are] extracellular matrix patches, or ground-up powders that you apply for wound healing or surgical applications—nobody had translated an [ECM] hydrogel,” said Christman. “This was the first one, [not to mention] going into a very high-risk location like the heart.”

For the 15 patients, the procedure was well-tolerated. Heart symptoms improved while exercise capacity significantly increased. Another phase 1 study is planned for coronary artery bypass graft patients who cannot be fully revascularized.

Building on that



In her lab, Christman works to develop minimally invasive therapies to improve cardiovascular and women’s health.

PHOTO: UNIVERSITY OF CALIFORNIA SAN DIEGO

success, Christman’s lab began looking at peripheral artery disease (PAD), for which there are no effective therapies. PAD leads to muscle atrophy and limb ischemia; severe cases lead to limb amputations.

• • •

“We think a lot about how we can use biomaterials to create new environments in the heart that will stimulate healing.”

—DR. KAREN CHRISTMAN

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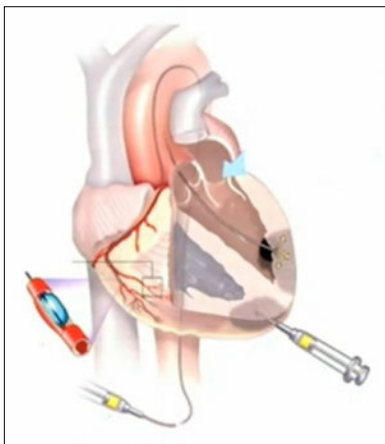
“We thought we could use a similar strategy of having an extracellular matrix hydrogel to stimulate healing of the tissue and, in this case, try to treat ischemic skeletal muscle,” Christman said.

Preclinical work looks promising. Using a rat model, her lab resected part of the femoral artery and vein—causing a decrease in blood flow followed by inflammation—then injected the hydrogel.

“We got significant improvements with the skeletal muscle extracellular hydrogel in perfusion down to the foot,” said Christman. The treatment prevented muscle atrophy and spurred regeneration, with significant increases in muscle stem cells.

Improving Women’s Health

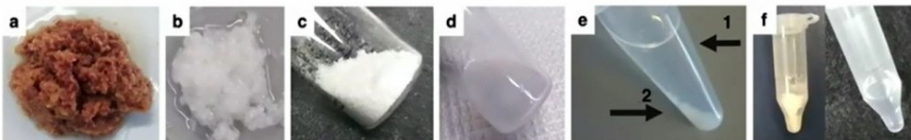
Recently, Christman’s lab also began focusing on women’s health. Collaboration with a physician-scientist with expertise in



“You can think of [the injectable hydrogel approach] as trying to create a healing wound inside the heart,” said Christman.



New Infusible ECM for Intravascular Delivery



Christman describes the process of making the ECM hydrogel, adding sterile water to ground-up cardiac tissue from pigs.

female pelvic medicine led to research on pelvic floor disorders, caused by injury to pelvic skeletal muscles commonly from vaginal birth. There are rehab exercises, compensatory devices and surgeries, said Christman, but “there’s nothing that is treating the muscle injury and trying to restore muscle function.”

In preclinical testing, when injecting either saline or skeletal muscle ECM hydrogel, “we get a greater restoration to healthy levels with the hydrogel,” she noted. The injection prevented atrophy, decreased fibrosis and showed signs of skeletal muscle regeneration.

“We’re hopeful we can actually accelerate this in the patient,” said Christman, “to see if we could use this in women showing signs of pelvic floor muscle dysfunction and prevent them from getting prolapse.”

Other Applications?

With heart patients, injection would take place weeks or even months after the MI, but Christman also seeks to treat patients at the time of infarction.

“There is a risk injecting anything into patients within the first month,” she said, “because going in there with the needle, poking in the myocardium, could set off arrhythmias” or ventricular ruptures.

One way in would be through balloon angioplasty, infusing the material in short bursts distal to the balloon.

Preclinical results suggest accelerated vascular healing.

Christman also continues to research new applications for ECM therapies and her lab has developed a new way to deliver decellularized ECM through intravenous delivery.

“This has applications beyond the heart, because there are a lot of diseases and conditions where you have inflamed, leaky vasculature,” Christman said.

Her lab has begun to study the potential of this infusible ECM to treat traumatic brain injury, pulmonary arterial hypertension and acute respiratory distress syndrome.

“We now think we have a therapeutic that can really be more broadly used across multiple conditions where you have leaky vasculature and inflammation,” Christman said. “We’re quite excited about the potential of them to reduce vascular leakage, accelerate vascular healing, be immunomodulatory and pro-survival.”

Studies also show the ECM hydrogels can improve cell survival and engraftment and may enhance retention and delivery of other biologics and medications.

“Extracellular matrix hydrogels can be a powerful strategy for regenerative engineering,” concluded Christman. “I think this really opens up the potential of using these hydrogel technologies for a lot of other indications.” **R**

NIDDK Council Adds Five Members

The advisory council of the National Institute of Diabetes and Digestive and Kidney Diseases added five new members:



Dawn Edwards

Dawn P. Edwards is co-chairperson in the National Forum of End-Stage Renal Disease Networks’ Patient Advisory Council, wellness ambassador in the Rogosin Institute in New York City, CEO of New York State

Chronic Kidney Disease Champions and a 30-year dialysis patient and home dialysis advocate. She joined the kidney, urologic and hematologic diseases subcommittee.



Dr. Keith Norris

Dr. Keith Norris is executive vice chair of the department of medicine for equity, diversity and inclusion and professor of medicine in the division of general internal medicine and health services research at the University of California Los Angeles. He joined the kidney, urologic and hematologic diseases subcommittee.

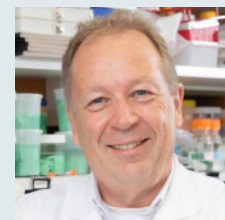


Dr. Debra Haire-Joshu

Dr. Debra Haire-Joshu is a health behavior scientist in obesity and diabetes prevention at Washington University School of Medicine in St. Louis, where she is the Joyce and Chauncy Buchheit professor in public health with a joint appointment at the

School of Medicine. She joined the diabetes, endocrinology and metabolic diseases subcommittee.

Dr. Philipp Scherer is director and professor at the Touchstone Diabetes Center at the University of Texas Southwestern Medical Center in Dallas. He joined the diabetes, endocrinology and metabolic diseases subcommittee.



Dr. Philipp Scherer



Ricky Safer

Ricky Safer is founder and CEO of Primary Sclerosing Cholangitis (PSC) Partners Seeking a Cure, a nonprofit that provides education and support to patients with PSC and their families as well as research support. She joined the division of digestive diseases and nutrition subcommittee.

Segay

CONTINUED FROM PAGE 1

(DBH) at the Indian Health Service, she works to ensure these communities receive needed mental health care.

“We coordinate national efforts to share knowledge and...develop and implement evidence-based, practice-based and culturally based activities across Indian country,” she said.

DBH oversees programs for alcohol and substance abuse and mental and behavioral health.

“Keep in mind that each community is different, so just because you hear American Indian or Native American doesn’t mean that all of us are the same,” said Segay. “We have different beliefs. We have different languages. Even our style of dressing is very different. Therefore, we have to be mindful about moving forward as far as what approaches [we use to] help.”

The Alcohol and Substance Abuse program (ASA) funds 12 youth treatment centers that provide holistic care to adolescents and families while integrating healing, spiritual values and cultural identification. Another effort is Preventing Alcohol-Related Deaths Through Social Detoxification.

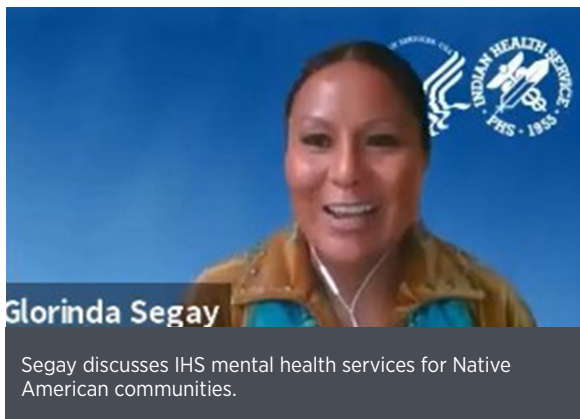
ASA also works to prevent and treat opioid abuse, which is pervasive on Indian reservations. “It is a crisis across Indian country,” Segay said.

ASA staff collaborate with IHS’s HOPE (heroin, opioids and pain efforts) committee, a network of IHS doctors, nurses,



A hot air balloon flies over Monument Valley Navajo Tribal Park in Utah.

PHOTO: SHUTTERSTOCK/GARY718



Glorinda Segay

Segay discusses IHS mental health services for Native American communities.

clinicians, pharmacists and epidemiologists. In addition, working groups focus on finding new approaches to managing pain, improving access to opioid overdose reversal medication and reducing the impact of perinatal substance use on future generations.

DBH also offers a range of services to prevent mental, emotional and behavioral disorders and to intervene early and rehabilitate those who need help. One large effort offers emotional trauma care and trains providers in culturally sensitive trauma care.

“For our native people, a lot of us went through some sort of trauma,” said Segay. “We try to think about our people, what can we do, how can we help them, those who are victims and survivors. We talk to our partners at the tribal level. We use our behavioral health consultants at the local level. There are boots on the ground; they come to us and let us know [what’s happening].”

Another large mental health effort requiring cultural sensitivity is suicide prevention.

“We all have different customs. We have to be mindful of how we talk about suicide,” said Segay. “There is always a lot of robust, fast and fierce discussion trying to find a resolution and what is most effective.”

Initiatives include staff training and developing appropriate screening

questions while strengthening data on suicide surveillance.

“In our upbringing, at least for me, there was no [discussion about suicide],” said Segay. “My parents kept us isolated. We used to live in the deep mountains, where we still live. We were cut off from the outside world. We only had a radio [with a signal only] to the local Navajo station, so we did not know about suicide.”

In training to become a provider, Segay learned about the cloaked crisis. “That’s where I started to see people do come forward,” she said. “They do ask for help.”

One way to deliver that help—which has been critical especially during the pandemic—has been tele-behavioral health, a growing effort across DBH to provide more convenient preventive, educational and treatment services to tribal communities.

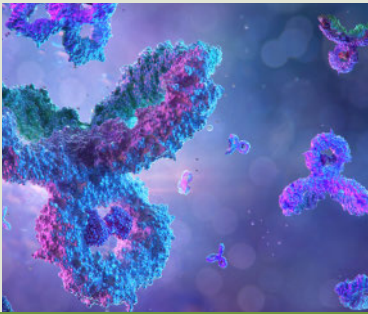
In some areas, it’s not as easy. Navajo Nation, for example, has more than 400,000 members sprawled across a large land area, parts of which do not have broadband access. Where possible, telehealth has helped many on and off the reservations.

DBH’s Telebehavioral Health Center of Excellence has 436 programs, offering direct, ongoing care at 24 IHS-tribal-operated facilities across the country. Services include psychiatry, medication management and therapy and counseling services for children, adults, couples and seniors. Health care providers can tune in to a variety of TeleECHO clinics for on-demand training and webinars on such topics as autism and pediatric immunization.

Another focus of DBH is integrating behavioral health with primary care. DBH’s Behavioral Health Initiative (BH2I) manages projects for substance abuse support and suicide and domestic violence prevention. A forensic health project was launched to address sexual violence and later expanded to include child and elder maltreatment.

By collaborating at the national, local and tribal levels, Segay aims to secure optimal services “so that our people can get the most effective, compassionate care moving forward, in the hopes they can recover and live a beautiful and healthy lifestyle.” **R**

Scientists Pinpoint Mechanisms Associated with Severe Covid-19 Blood Clotting



Antigens against SARS-CoV-2
SHUTTERSTOCK/CORONA BOREALIS STUDIO

After studying blood samples from 244 patients hospitalized for Covid-19, a group of researchers, including NIH investigators, identified “rogue antibodies” that correlate with severe illness and may help explain mechanisms associated with severe blood clotting.

The researchers found circulating antiphospholipid antibodies, which can be more common among people with autoimmune disorders, such as lupus. However, these “autoantibodies,”

which target a person’s own organs and systems, can also be activated in response to viral infections and activate other immune responses.

Scientists compared the blood samples to those from healthy controls and found the Covid-19 samples contained higher levels of the antibody IgG, which works with other immune cells, such as IgM, to respond to immune threats. Higher levels of IgG were also associated with Covid-19 disease severity, such as in patients who required breathing assistance.

IgG helps bridge a gap between innate and adaptive immune responses—a process that helps the body recognize, respond to and remember danger. In normal cases, these features help protect the body from illness and infection. However, in some cases, this response can become hyperextended or altered and exacerbate illness.

When researchers removed IgG from the Covid-19 blood samples, they saw molecular indicators of “blood vessel stickiness” fall. When they added these same IgG antibodies to the control samples, they saw a blood vessel inflammatory response that can lead to clotting.

Since every organ has blood vessels in it, circulating factors that lead to the “stickiness” of healthy blood vessels during Covid-19 may help explain why the virus can affect many organs, including the heart, lungs and brain.

The researchers noted future studies could screen Covid-19 patients for autoantibodies at earlier points of infection to help identify patients at risk for extreme blood clotting, vascular inflammation and respiratory failure. Corresponding studies could then assess potential treatments to protect blood vessels or fine-tune the immune system.

Scientists Discover New Molecular Pathway Shared by Two Neurodegenerative Disorders

Scientists from two independent research teams have discovered how the mislocalization of a protein, known as TDP-43, alters the genetic instructions for UNC13A, providing a possible therapeutic target that could have implications in treating amyotrophic lateral sclerosis (ALS), frontotemporal dementia (FTD) and other forms of dementia. The studies were published in *Nature*.

ALS and FTD are two neurodegenerative disorders in which many cases are linked by mislocalization of TDP-43.

One study, a collaboration between NINDS and the University College London, initially looked at lab-grown neurons derived from human-induced pluripotent stem cells (iPSCs)—stem cells created from a patient’s tissue sample, often skin or blood. Using powerful genetic tools, the researchers created neurons that made much less TDP-43 protein than normal, resulting in the appearance of abnormal mRNA sequences called cryptic exons.

The UNC13A gene is important for maintaining the connections between neurons and has been shown to be a risk factor for both ALS and FTD. UNC13A is also one of the mRNA sequences that contained cryptic exons when TDP-43 was reduced. Cryptic exons were also seen in neurons taken from postmortem tissue of ALS and FTD patients. These findings directly link a well-established risk factor for ALS and FTD with the loss of TDP-43.

“We have built on years of genetic research that identified that UNC13A was implicated in motor neuron disease and FTD and supported it with a new molecular biology finding that confirms the gene is absolutely fundamental to the disease process,” said NINDS scientist Dr. Michael Ward.

At the same time, researchers from Stanford and the Mayo Clinic in Florida were analyzing postmortem neurons from patients with FTD or ALS. When genes were compared between neurons with and without TDP-43, UNC13A again emerged as one that was significantly affected by TDP-43 loss.

Both studies provide clues toward strategies to prevent the death of neurons in these disorders.

Can Restricting Calories Extend Your Life?

Calorie restriction—reducing food intake without causing malnutrition—can yield health benefits that include improved metabolism and delayed onset of age-associated diseases. But extreme caloric restriction—a 40 percent reduction in calories—is associated with impaired immune function, which can lead to more severe infections.



Researchers are studying potential health benefits of calorie restriction.

PHOTO: SHUTTERSTOCK/ANDREY POPOV

A team of researchers led by Dr. Vishwa Deep Dixit at Yale University School of Medicine explored the metabolic and immune effects of calorie restriction in a study partly supported by NIA and NIAMS. Results appeared in *Science*.

The team used samples from a clinical trial called CALERIE in which participants, ages 25–45, were asked to reduce their calorie intake by 25 percent over 2 years. Participants whose samples were used reduced their calorie intake by an average of about 14 percent.

MRI was used to examine the thymus, an organ in the chest that produces immune system T cells. The thymus usually accumulates fat with age and produces fewer T cells. After 2 years of calorie restriction, participants had larger thymuses than at the beginning of the study. These enlarged thymuses had less fat and produced more T cells. Control participants who did not restrict calories showed no change in thymus size or function.

The team found that calorie restriction led to changes in gene activity in body fat and associated immune cells. They chose to study the gene *Pla2g7*, which regulates inflammation. Caloric restriction inhibited its activity.

To study the effects of this inhibition, the scientists bred mice that lacked the gene *Pla2g7*. Mice without *Pla2g7* gained less weight from eating a high-fat diet than control mice and were less likely to develop fatty liver disease. They also burned more fat than control mice. In addition, aged mice lacking *Pla2g7* had less inflammation and larger, more productive thymuses.

“These findings demonstrate that *PLA2G7* is one of the drivers of the effects of calorie restriction,” Dixit said. “Identifying these drivers helps us understand how the metabolic system and the immune system talk to each other, which can point us to potential targets that can improve immune function, reduce inflammation and potentially even enhance healthy lifespan.”—adapted from *NIH Research Matters*

Vollberg Departs NIH After 28 Years of Service

Dr. Thomas Vollberg, director of NIMHD's Office of Extramural Research Administration (OERA), has retired after 28 years of meritorious service to NIH.

"I had a fulfilling career at NIH," he said. "I was proud to be part of a noble mission and to have the opportunity to contribute through effective collaborations across institutes and centers in my various roles. I felt valued and respected and it was my distinct honor to work with colleagues who were just as passionate about carrying out NIH's mission."

Vollberg's NIH career began at NIEHS in 1987 as a staff fellow in the Laboratory of Pulmonary Pathobiology. He left in 1993 to join the faculty in biomedical sciences at Creighton University School of Medicine. He returned to NIH in 2000 as an NCI scientific review officer (SRO) in the Special Review and Logistics Branch in the Division of Extramural Activities (DEA).

At NCI, Vollberg rose to serve as deputy chief and as DEA liaison to the NCI SBIR Development Office and the NCI Office of Acquisitions. In 2015 he was selected as NIMHD's scientific review chief. He was promoted in 2018 as acting director of OERA and was confirmed as permanent OERA director in 2019.

In that position, Vollberg made strides to advance the institute's practices for Funding Opportunity Announcement development, for the sharing of experiential knowledge through a regular forum of conversation on extramural practices and for the dissemination of extramural policy guidance.

Throughout his career, problems in cancer research featured prominently as a window for a broad appreciation and understanding of human biology. His interest in this interdisciplinary area of study began at LaSalle College, where he was awarded a B.A. in biology. He completed doctoral training in human experimental pathology at Thomas Jefferson University.

In a postdoctoral position at Temple University, Vollberg was part of the Fels Research Institute, an NCI Cancer Center actively involved in molecular studies of DNA repair.

As a faculty member at Creighton

University, Vollberg and his laboratory colleagues studied epithelial cell biology, differentiation-related gene regulation and the molecular action of retinoids. He lectured to medical and health sciences students on human anatomy and to graduate students for cell biology and gene regulation topics.

His work as SRO covered a spectrum of NCI research, including cancer health disparities. He led and supported the review of innovative technologies, genomics, bioinformatics,

innovative diagnostic device and drug development, preclinical pharmacology and toxicology, pharmaceutical sciences, clinical investigations, informatics tools, communication science, behavioral research and epidemiology.

Vollberg became widely recognized across NIH as an expert in all aspects of the management of peer review activity for grants and contracts and distinguished himself as a subject matter expert on procedures and policies related to the announcement, selection and awarding of contract proposals. He contributed to NIH work groups for process improvement and as a peer educator in the NIH extramural core curriculum.

Vollberg received NIH Office of Director Awards, NCI Director's and NCI Merit Awards, NIAID Director's Awards and NIMHD Director's Teamwork and Collaboration Awards—all in recognition of his innovative leadership and outstanding collaboration.

After retirement, Vollberg and his wife plan to travel more and relocate from their current home, where they have resided for 21 years, to coastal Delaware. He's also hoping the downtime will allow him to read more for pleasure and learn to play the guitar.



Dr. Thomas Vollberg

Gerberding Named CEO of FNIH

The Foundation for the National Institutes of Health appointed Dr. Julie Louise Gerberding as its next chief executive officer. She will assume her role on May 16.



Dr. Julie Louise Gerberding

"The board sought a visionary, trailblazing leader and I am tremendously excited we have found that person in Julie Gerberding," said Dr. Steven M. Paul, chair of the FNIH board of directors. "FNIH has generated terrific momentum collaborating with NIH, other government agencies and the private sector to deliver breakthrough biomedical research discoveries."

Before joining FNIH, Gerberding served as chief patient officer and executive vice president, Population Health & Sustainability at Merck. She joined the company in 2010 as president of vaccines. Previously, she served as CDC director from 2002-2009 and was the first woman to hold the position.

Prior to joining CDC, Gerberding was a tenured member of the faculty at the University of California San Francisco, where she completed her residency and fellowship in infectious disease and clinical pharmacology.

"It is hard to imagine a more accomplished and respected public health leader than Julie Gerberding at the helm of FNIH," said acting NIH director Dr. Lawrence Tabak. "The foundation has been a critical partner to NIH in addressing some of the most vexing health challenges of our times. I am excited to work closely with Julie to make even more progress to achieve our shared mission to enhance health, lengthen life and reduce illness."

'A GIANT IN GLOBAL HEALTH' Remembering Paul Farmer

BY DANA TALESNIK

NIH mourns the passing of Dr. Paul Farmer, global health leader, physician, medical anthropologist, Harvard professor, author and longtime friend of NIH. He died in



Dr. Paul Farmer

Rwanda on Feb. 21 of an acute cardiac event in his sleep. He was 62.

Farmer had spent decades expanding health care access and providing medical care to the world's poorest, under-

served populations. To broaden his efforts, in 1987 he co-founded the nonprofit Partners in Health (PIH) that today operates in 12 countries across Africa, Latin America, Central Asia and the U.S. Operating under the notion that everyone should have access to health care, wherever they live, no matter their circumstance, Farmer's work has saved countless lives.

"Paul Farmer was a giant in global health who changed the way health care was delivered with a focus on equity. He inspired us with his kindness, humility, humanity



In 2016, former NIH director Dr. Francis Collins (l), Farmer (c) and FIC director Dr. Roger Glass planted an American Beech near Fogarty's Stone House, a building that symbolizes NIH's commitment to international cooperation to improve the health of people worldwide.

PHOTO: BILL BRANSON

and wisdom," tweeted Fogarty International Center director Dr. Roger Glass, learning of Farmer's untimely passing.

Farmer's interest in helping the poor began as a child. Raised in a Florida trailer park, and once having lived in an abandoned school bus, he grew up picking fruit with Haitian migrant workers. He later met and interviewed more migrant workers on tobacco plantations near Duke University, where he studied medical anthropology on scholarship. Then, as a doctoral student at Harvard, between labs and exams, Farmer began visiting public health clinics in Haiti.

"He was an iconoclast," said Glass. "I think Paul was stimulated by the fact that people said he couldn't do things [and then he did them], starting in Haiti where he really got engaged in thinking about primary care that led to the development of a whole program [there] and the building of a [high-tech] hospital."

In Peru, Farmer defied skeptics who told him it was too difficult and expensive to address multidrug-resistant tuberculosis. Determined, he launched studies and procured treatments for people with this virulent type of TB.

And it was almost unimaginable to have a state-of-the-art hospital-university complex in a remote area in Africa, noted Glass. Yet, in Rwanda, Farmer's PIH built Butaro Hospital on a mountaintop and then a medical school—the University of Global Health Equity (UGHE)—next to it. Farmer tirelessly

raised funds, recruited staff and successfully lobbied Rwanda's government for a road and utilities to support the complex.

"He was a visionary; he changed the world," said Glass, who last saw Farmer in December at UGHE's white coat ceremony honoring its first cohort of medical students.

"Paul was the most remarkable model the modern world has seen of what a doctor can be," said former NIH director Dr. Francis Collins. "He practiced



Farmer met with NIAID patient Melva Fernandez Quispe (then age 7) from Peru in 2016 while she was receiving treatment at the Clinical Center for an infection. Farmer's organization, Partners In Health, helped arrange her travel and stay at NIH.

PHOTO: BILL BRANSON

medicine with unbounded compassion and lived his faith every day, reaching out to those in greatest need, and following the principle that led to the founding of Partners in Health: unconditional kindness."

NIH's connection with Farmer went back many years, a relationship that included reciprocal tree plantings, celebrations and lectures. Farmer's most recent visits to NIH included delivering the Barmes lecture on global health equity in 2016 and the Grand Rounds Great Teachers lecture on community-based care for infectious diseases in 2009, during which he also visited Clinical Center patients.

"I will greatly miss his joyful presence," Collins said, "but his legacy will endure in all those whose lives he has touched. I am honored to be one of them."

Farmer is survived by wife Didi Bertrand and three children.



Dr. Agnes Binagwaho, vice chancellor of UGHE, with Glass (c) and Farmer in December

PHOTO COURTESY ROGER GLASS



At left, one side of the mural in the underpass; above, speaking at the dedication are NIH acting principal deputy director Dr. Tara Schwetz and Naval Support Activity Bethesda commanding officer Capt. Scott Switzer.

CROSSING NAMED 'ALPERSON WAY' Rockville Pike Pedestrian Tunnel Dedicated

NIH leaders joined several federal, Maryland state and Montgomery County officials near the Medical Center Metro station on Feb. 25 to formally dedicate the pedestrian tunnel connecting NIH and Walter Reed National Military Medical Center (WRNMMC).

The event marked completion of the MD 355 Crossing Project, which was part of the Department of Defense's Base Realignment and Closure (BRAC) process.

Before pandemic safety measures reduced traffic in the area, 1.5 million pedestrians were estimated to cross MD 355 every year. The intersection at Rockville Pike and South Drive, where the Metro station is located, sees particularly heavy vehicular traffic—especially during rush hour—with transit, commuter and shuttle buses as well as cars, vans and other automobiles traveling to either medical facility. Getting from one side of the roadway to the other had been a safety concern for decades. The new passage opened in September 2021.

"NIH, WRNMMC and the Uniformed Services University of Health Sciences are long-time research collaborators," said NIH acting principal deputy director Dr. Tara Schwetz. "The underpass will ensure the safety of employees, patients, trainees and medical and graduate students when crossing between the NIH and Walter Reed campuses."

Community leaders dedicated the underground walkway—which will also accommodate bicyclists—to a 32-year veteran public servant and former staff member of U.S. Sen. Chris Van Hollen (D-MD), Phil Alpers, who died May 14, 2020. Silver Spring native Alpers advocated for construction of the tunnel and also worked for Montgomery County as military installations/BRAC coordinator.

"This passage, now named 'Phil Alpers Way,' will provide safe crossing for [thousands] who traverse the very busy MD 355 between two great American institutions...and connect to the Medical Center Metrorail station," Van Hollen said at the dedication, staged under a tent near the tunnel.

"During my time serving in the House of Representatives, Phil was my legislative director. He shared in my belief that government can deliver meaningful results for our community and he fought to uphold our promise to provide world-class medical care to those serving our country in uniform. Phil helped me secure the federal funds to make it happen and then became the head of the Montgomery County government group that implemented the plan. As a result, our men and women in uniform will be able to more easily access the care they need and the dedicated federal employees who care for them can get to

work more easily and more safely...Phil's legacy of public service and his commitment to our men and women in uniform will live on, not only through the completion and dedication of this project he helped make a reality, but through his family, friends and colleagues who carry his spirit and commitment to 'The Alpers Way' with them each day."

Also on hand for the ceremony were Montgomery County Executive Marc Elrich; Naval Support Activity Bethesda commanding officer Capt. Scott Switzer; Washington Metropolitan Area Transit Authority general manager & CEO Paul Wiedefeld and members of the Alpers family.

In addition to the underpass, the crossing project also included roadway and surface improvements such as a traffic signal, pavement resurfacing, sidewalk/bike path, median work and storm water management.

Construction of the complex passage took more than 5 years and includes new 120-foot-deep high-speed elevators, emergency stairs creating direct access between the Metro station and the east side of MD 355 and a new elevator and staircase between the existing Metrorail platform and mezzanine level.



The underpass is named "Phil Alpers Way" to honor one of its strongest proponents. His wife and daughter attended the dedication.

PHOTOS: CHIA-CHI CHARLIE CHANG



At left, in the underground passageway, representatives from several organizations that were instrumental in concept and construction of the MD 355 Crossing Project; at right, U.S. Sen. Chris Van Hollen (D-MD) speaks at the tunnel dedication.