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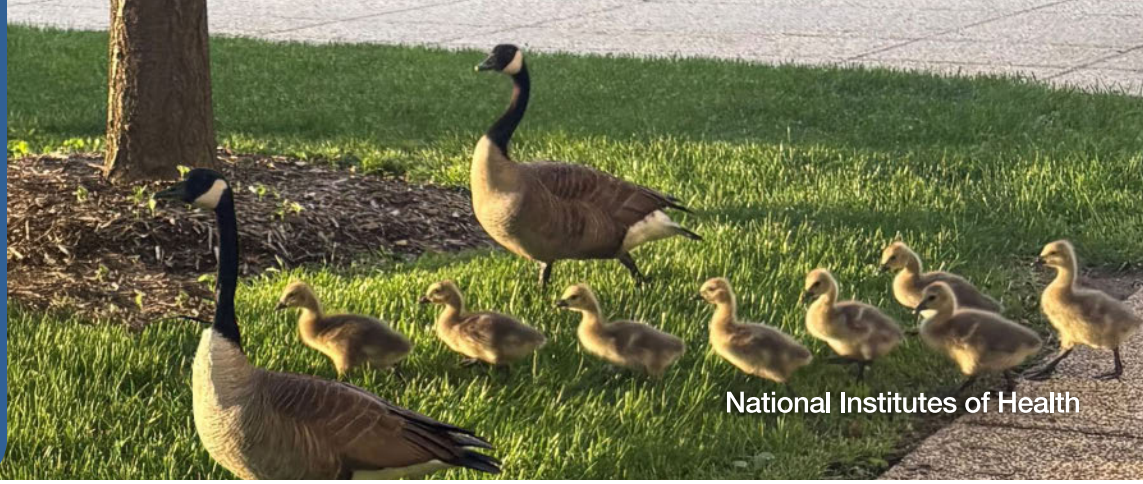

National Institutes of Health

Kilgore Counters Threats to Protect the NIH Mission

BY DANA TALESNIK

After Patrick Kilgore interviewed for an NIH position last year, he was surprised to learn NIH had selected him—for another position.


Patrick Kilgore, outside Bldg. 31
PHOTO: DANA TALESNIK

Kilgore had applied to be director of DPSAC, NIH's Division of Personnel Security and Access Control, but when he arrived last summer, he became head of the newly created Office of Defensive Counterintelligence and Personnel Security (ODCPS).

NIH had long wanted to elevate its Defensive Counterintelligence and Insider Threat Program. When the Office of Research Services (ORS) leadership learned of Kilgore's background and skillset, they realized he was the ideal person for the job.

"We've taken the insider threat program to another level," said Kilgore. "Because I'm a trained federal investigator, we now are actually doing insider threat investigations."

ODCPS conducts due diligence to make sure there are no illicit foreign connections or other threats in NIH's transactions with outside organizations, businesses and individuals.

"When you think of counterintelligence or insider threats, that sounds scary," Kilgore said. "But in reality, all we're doing is coming up beside another program and helping them

SEE **KILGORE**, PAGE 5

Neurosurgeon Develops AI Device to Restore Speech in Patients with Paralysis

BY ERIC BOCK

Dr. Edward Chang has pioneered what was once considered impossible: building a device that restores the ability to speak for people with severe paralysis.

"Speech allows us to communicate 150 words per minute," said Chang, the chief neurosurgeon at the University of California, San Francisco, speaking at a recent NIH Director's Lecture held in Lipsett Amphitheater. "It's such a special human behavior. It allows me to transmit an idea from my mind to yours and back quickly."


Dr. Edward Chang

The act of speaking is about "shaping the breath." It starts with an exhalation of air from the lungs. The air then moves through the voice box, also known as the larynx, and vibrates the vocal folds to create "the voice energy of our words," Chang explained.

"The voice energy then goes through the upper part of the vocal tract—the lips, jaw and tongue. The movements create a filter on that sound. That's what gives rise to the consonants and vowels we speak."

An area in the brain's sensorimotor cortex plays a key role in speech production. Chang's lab uses a high- resolution technique called electrocorticography to study speech production's "neural code," the pattern of electrical activity directly from the surface of the brain.

SEE **STORY**, PAGE 4

NIH, FDA Announce New Joint Venture in Nutrition

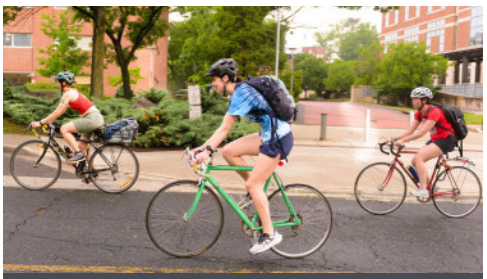
The Food and Drug Administration (FDA) and NIH have announced a new research collaboration.

With diet-related chronic diseases continually rising, it's imperative that the FDA and NIH work closely to prioritize a better understanding of the root causes to end the diet-related chronic disease crisis and safeguard the health of America's children.

Under the new Nutrition Regulatory Science Program, the FDA and NIH will implement and accelerate a comprehensive nutrition research agenda that will inform effective food and nutrition policy actions to help make Americans' food and diets healthier.

The initiative will aim to address: how and why ultra-processed foods harm people's health; whether certain food additives affect metabolic health and contribute to chronic disease; the role of maternal and infant

SEE **NUTRITION**, PAGE 5


NIH'ers roll onto campus on May 15 as part of Bike to Work Day. See p. 8.

ALSO THIS ISSUE

Nobel Laureate Bertozzi to Deliver Pittman Lecture

June 11

Dr. Carolyn Bertozzi, co-recipient of the 2022 Nobel Prize in Chemistry, will deliver the Margaret Pittman Lecture on June 11 at 2 p.m. ET in Lipsett Amphitheater, Bldg. 10, and online via NIH videocast. Her talk is titled, "Bioorthogonal Chemistry: The Journey from Basic Science to Clinical Translation."

Dr. Carolyn Bertozzi

Part of the Wednesday Afternoon Lecture Series (WALS), this is the long-awaited, postponed lecture from the 2023–2024 WALS season.

Bertozzi is the Anne T. and Robert M. Bass Professorship in the School of Humanities and Sciences at Stanford University and an HHMI investigator. She is a pioneer in bioorthogonal chemistry, a field that studies and develops chemical reactions that can be performed within living organisms without interfering with native biochemical processes, enabling groundbreaking advances in molecular imaging and targeted drug delivery.

Bertozzi's work in glycobiology, especially in understanding and manipulating cell surface sugars (glycans), has opened up new possibilities for diagnosing and treating diseases, particularly cancer. Her story underscores the power of fundamental science and its potential to lead to transformative breakthroughs.

The lecture honors the legacy of Margaret Pittman, the first female laboratory chief at NIH. Continuing medical education credits will be available. For more information and reasonable accommodation, email WALSoffice@od.nih.gov. —**Diana Gomez**

Li to Discuss Transformative AI

June 13

Dr. Fuhai Li

NIH's Office of Data Science Strategy hosts a seminar series to highlight models of data sharing and reuse on the second Friday of each month. The next seminar, "Transformative AI for Deep Mining of Omics and Literature Data," will take place on June 13 at noon.

Transformative artificial intelligence (AI) models are powerful tools for large-scale mining of biomedical data. In this talk, Dr. Fuhai Li will present novel approaches his lab has developed to combine large language models (LLMs) with graph-based AI to integrate and analyze vast omics datasets for identifying disease targets, mapping signaling pathways and predicting effective drug combinations. The key component of this novel AI system is the text-numeric graph (TNG), a structure in which graph entities and associations carry both textual and numeric attributes.

Li, associate professor in Washington University's school of medicine and computer science & engineering, will also introduce an AI multi-agent system that his team developed to accelerate biomedical discovery by unifying omics data analysis, literature-based deep search and reasoning to generate novel scientific hypotheses. He will also showcase the applications of these novel AI tools with analysis of heterogeneous pharmacogenomics data for cancer research.

Before joining WU, Li was an assistant professor at Ohio State University. He received his Ph.D. in applied mathematics in Beijing University and completed his postdoc training at Harvard Medical School in computational biology.

FNIH, Noom Leaders Tour Metabolic Unit

Leaders from the Foundation for the National Institutes of Health (FNIH) and Noom, a tech platform that helps people reach their wellness goals, recently visited researchers in the Clinical Center's Metabolic Clinical Research Unit to learn about their controlled nutrition and weight management studies.

David Carmel (front, c), senior vice president of the Foundation for the NIH with (standing, from l) Mgbeodichinma (Vicky) Ezeakolam, lead nurse; Dr. Amber Courville, staff scientist; Geoff Cook, CEO and Norman Petty, executive vice president of Noom; Katie Robinson, chief of staff, strategic alliances and operations, FNIH; and Dr. Kong Chen, co-director, NIH's Metabolic Clinical Research Unit

Improving Accessibility at NIH

BY STEPHANIE BRADLEY AND ANTONIO HAILESELASSIE

Each year, on the third Thursday in May, the world recognizes Global Accessibility Awareness Day (GAAD). This year, GAAD highlighted the importance of digital access for people with disabilities. Founded in 2012 by accessibility advocates Joe Devon and Jennison Asuncion, GAAD encourages individuals and organizations to consider how technology impacts people of all abilities and take meaningful steps toward building more accessible digital environments.

At NIH, GAAD reaffirmed our commitment to accessibility in both physical and digital spaces. The NIH Section 508 Office plays a key role in this ongoing effort by ensuring NIH websites, applications and electronic documents meet federal accessibility standards. Employees planning to launch intranet pages, digital forms or virtual training models are encouraged to consult with the 508 Office early in their process to ensure accessibility is considered from the start.

An example of the 508 Office at work is their regular review of internal training materials. The team ensures materials are compatible with screen readers and include accurate captions, alt text and logical tab navigation. These continuous efforts ensure that all employees benefit from NIH's e-learning platforms.

The NIH Assistive Technology Suite also supports this mission by providing hands-on access to a variety of supportive tools, including screen readers, magnifiers, speech-to-text software, alternative keyboards and ergonomic equipment tailored to individual needs. To help employees make the most of these resources, staff can schedule an appointment for an ergonomic assessment, assistive technology recommendations or help in identifying appropriate accommodations. This service is available for those experiencing challenges with workstation setup, visual access, physical limitations or other barriers to perform effective work. To learn more and request an appointment, email eeo.accessibility@nih.gov.

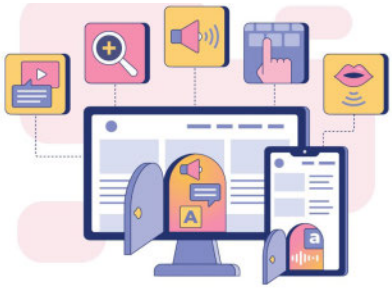


IMAGE: GRAPHIC WITH ART / SHUTTERSTOCK

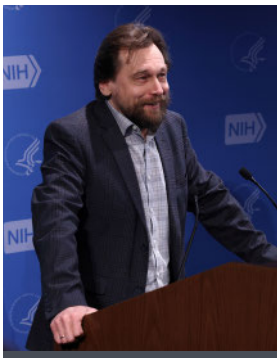
As we reflect on GAAD, remember NIH can help you explore accessibility resources and take proactive steps in creating a more usable, barrier-free workplace.

For questions related to Section 508, email nihsection508help@od.nih.gov. For broader accessibility concerns across NIH facilities or systems, contact eeo.accessibility@nih.gov.

Gladyshev Shares Insights on Aging, Longevity

BY CHARLES ROSE

How do we all live longer, healthier lives? Dr. Vadim Gladyshev examined fundamental questions and new frontiers in the science of aging in his recent Florence Mahoney Lecture in Lipsett Amphitheater.



Dr. Vadim Gladyshev

Gladyshev, professor of medicine at Brigham and Women's Hospital and Harvard Medical School, discussed the nature of aging and principles of lifespan control. Understanding the molecular pathways that contribute to aging and longevity is critical, said Gladyshev, who underscored the need to quantify the aging process across cells and species, as well as in response to interventions. Such quantification can be accomplished with biomarkers of aging, such as epigenetic, transcriptomic and proteomic clocks.

Gladyshev, whose multiple career accolades include a 2013 NIH Pioneer Award, a 2019 NIH Transformative Award and election to the National Academy of Sciences, discussed various pharmacological, dietary or genetic intervention strategies with the potential to delay age-related diseases or even partially rejuvenate cells or entire organisms.

At an exhibit in the NIH Clinical Center, Gladyshev (r) shows Hodes (l) a mask similar to the one he wore as a postdoc in Dr. Thressa Stadtman's lab.

Gladyshev has studied the genomes of naturally long-lived animals such as bowhead whales, naked mole rats and bats. "The information we could gain from analyzing longevity across species may be used in the future for radical changes in lifespan, in contrast to interventions currently studied in labs, which offer only marginal longevity benefits," he said.

> *"If we can target the aging process itself, we can delay the onset of all these diseases at once."*
>
> -DR. VADIM GLADYSHEV

His earlier research has also highlighted the essential mineral selenium—found in breads, grains, meat, poultry, seafood and eggs—for its various roles in biology and medicine. Gladyshev and his team have discovered the full of set of human selenoproteins (the selenoproteome) that contain selenocysteine, a selenium-containing amino acid.

NIA Director Dr. Richard Hodes (l) presents the Mahoney lecture award to Gladyshev.

PHOTOS: CHIA-CHI CHARLIE CHANG

In his WALS lecture, Gladyshev outlined multiple interesting ongoing areas of exploration in aging science, including the relationship between longevity across species, longevity across interventions, and aging, as well as organ-specific aging, wherein organs and systems with accelerated aging in the body are more prone to developing disease. Gladyshev has also reported that stressful events such as major surgery, serious infections and pregnancy can temporarily increase biological age.

"Once you start studying aging, it's hard to study anything else," Gladyshev said. "The problem is so important that nothing really compares to it... in biology and medicine. Most diseases that medicine studies are the diseases of aging, and if we can target the aging process itself, we can delay the onset of all these diseases at once. This is why it's so appealing, but also incredibly difficult to study aging."

Gladyshev's full talk can be viewed at https://videocast.nih.gov/watch=55029.

ON THE COVER: A family of geese take an afternoon stroll behind Bldg. 31.

IMAGE: JESSICA HILLER, OD/OCPL

The NIH Record

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NIH National Institutes of Health
Turning Discovery Into Health

Chang

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When Chang started his lab 15 years ago, "I recognized we didn't understand very much about the organization or the basic principles by which the human brain processes words."

Since then, Chang's lab has been studying how the neural code corresponds with different aspects of speech control. Their research has revealed a complex map in our brains where specific neurons are tuned to different speech sounds in the English language.

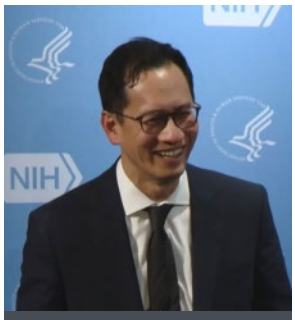
His lab's earliest experiments focused on brain mapping in patients with severe epilepsy. These patients had electrode arrays implanted on the surface of their brains to measure electrical activity. Each array had 256 electrodes arranged in a 16-by-16 grid. The electrodes help doctors pinpoint exactly what tissue is responsible for the seizures, so it can be removed to cure the seizures.

In one early experiment, Chang asked the patients to read a list of syllables, such as "ba," "da" and "ga." Saying each sound out loud requires a different set of movements from the muscles in the vocal tract.

"When you make that 'ba' sound, your lips come to closure. It's the release of your lips that creates the sound. The tongue tip from the top of your upper tooth creates the 'da' sound. The 'ga' sound is the back of the tongue going up," he explained. "It was fun to learn all of this. I had no idea how I was exactly speaking."

When people are speaking those sounds, Chang and his colleagues discovered distinct patterns of brain activity in the cortical areas that control the vocal tract for producing consonants and vowels. Further studies revealed the area of the brain responsible for vocal tone, or the ability to adjust the intonational pitch of one's voice prosody.

"Interestingly, when we played back people's speech through a speaker, we found these areas were also activated by what they heard," he said. "This means there's auditory processing in this part of the brain as well. It's encoding both the pitch of what we've heard, and what we are saying."



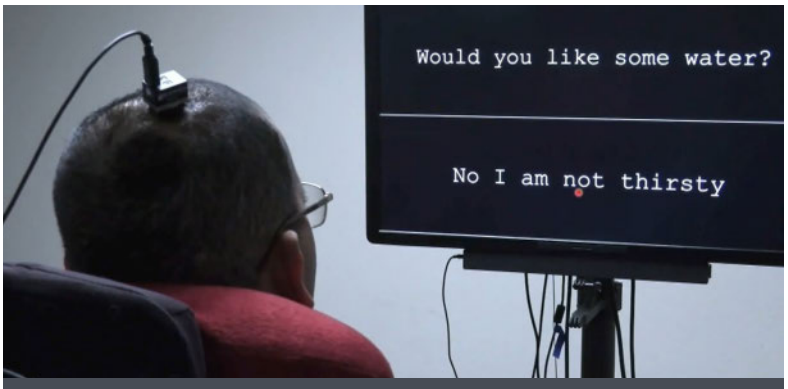
Chang speaking to NIH

Chang has taken their fundamental discoveries about the neural basis of speech production to build a device that restores communication for people with paralysis. He termed this technology a "speech neuroprosthesis," which uses artificial intelligence (AI) algorithms to decode brain activity patterns into words.

Previously, most attempts using neural interfaces focused on spelling-based approaches. To communicate, those who use these devices typed out letters one-by-one. A drawback to this approach is typing takes much longer than speaking to communicate.

Early on, Chang's colleagues remarked that what he was doing was impossible. They said speech was too complex and abstract. Although it seemed unattainable, he believed it was possible because of scientific advances in his understanding of the neural code as well as rapid progress in AI.

His lab conducted proof of principle demonstrations with patients with epilepsy, who were not paralyzed, but needed brain mapping for seizure surgery. Chang asked them to read sentences. As they read aloud, he recorded their brain activity. His team built a computer model that translated brain activity into movement and then translated those movements into sounds. While imperfect, the speech synthesized from neural activity was intelligible.



A volunteer uses technology that gives him a voice by decoding his speech.

The results were promising enough that Chang believed he could now try this approach with someone who was paralyzed. He partnered with a colleague to launch the BRAVO (Brain-Computer Interface Restoration of Arm and Voice) study. The trial's first participant—a man named Pancho—had a severe brainstem stroke that damaged the connection between his brain and his vocal tract and limbs.

Chang surgically implanted an electrode array over the patient's speech motor cortex more than six years ago, and it is still transmitting strong signals. Every week, Chang and his team have worked to "translate the electrical neural code into words and more."

Pancho initially worked with researchers to create a 50-word vocabulary. They asked him to say each word several times. As he tried, an AI algorithm learned to distinguish brain patterns to predict which word he was attempting to say.

The system basically worked. Chang found the neuroprosthesis could do a "decent, but not perfect job" predicting which word Pancho wanted to say. The system confused words that were similar, such as "is" and "it" most often. It did a better job differentiating words that sounded different. It also used an "auto-correct" function to increase accuracy. Recently, Chang and colleagues proved the device could decode whether Pancho, who is bilingual, was speaking his native language, Spanish, or his second language, English.

A second patient, Ann, who also experienced a brainstem stroke and was paralyzed, reached out to Chang after reading about Pancho's experience. Chang implanted an electrode array with twice as many sensors.

The new device was accurate and fast. Continued efforts significantly improved the translation time to synthesized words, which were personalized using recordings of her pre-injury voice. Additionally, the team built an "embodied" speech neuroprosthesis system that translates her brain signals into verbal and non-verbal facial movements that appeared on a speaking avatar. Several research groups across the country have now replicated their findings in other patients.

"It's no longer about whether this is possible," Chang concluded. "It's now a question of how good we can make it."

Kilgore

CONTINUED FROM PAGE 1

do their job in a safe environment, ensuring the grants we're giving are going to the appropriate organizations, and that there is no threat of undue foreign influence."

ODCPS has been successful in their efforts. "We've saved probably $380 million by preventing misappropriate activity," he said.

"Part of my job is ensuring you have a safe place to work," said Kilgore, who is devoted to helping safeguard NIH and its mission.

"NIH has such a great mission," he said. "How could you not be motivated to come in every day and try making a difference?"

Kilgore's office works with every NIH institute and center and partners with HHS's Office of National Security to protect NIH intellectual property, personnel and facilities.

"There's a real shift to look at national security in all of our processes to make sure we protect the scientific information that is so valuable," he said. It's a coordinated effort between intelligence monitoring and the physical protection provided by the ORS Divisions of Police, Emergency Management and Physical Security.

Kilgore began his career with the U.S. Air Force where he served for 21 years, first in supply, intelligence operations, and then as a police officer. He finished his USAF service as a senior enlisted adviser for his military installation, working to ensure airmen were mission-ready to deploy.

"It was a blessing to be in that position," he recounted, "and that mentality is what I carry over in everything I still do."

Kilgore then joined the Federal Bureau of Investigation (FBI), starting in the Buffalo, N.Y. field office and soon after relocating to Washington to become chief security officer (CSO) for FBI's largest division—counterterrorism. For seven years, he was responsible for the safety of staff—physical, electronic, operational—wherever agents deployed. He went on to handle all high-risk adjudications. In that role, he worked with the polygraph unit, embassies, staff overseas and police around the country to support the FBI's mission-critical tasks.

Ten years ago, Kilgore and his family moved back to his home state in Wisconsin to help care for his ailing father. There, he took a position as state director of the Department of Labor's veterans employment and training service (VETS).

Six years ago, Kilgore retired. But last year, his wife encouraged him to find a job to get him out of the house. Auspiciously, he found NIH.

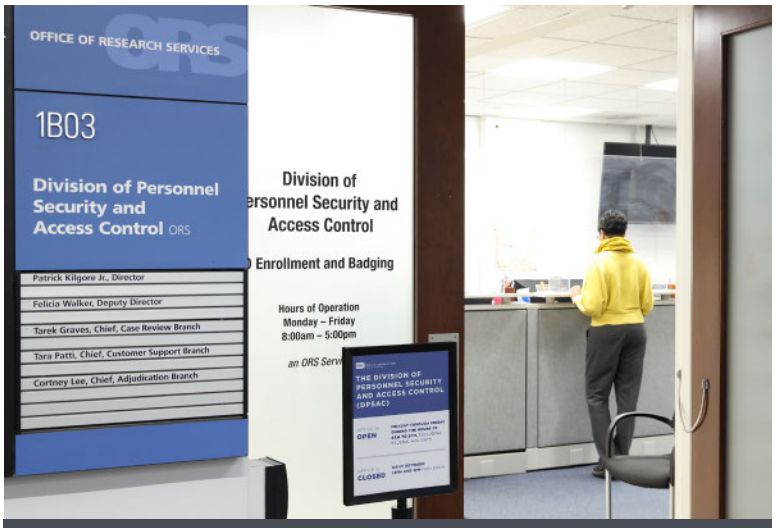
"I was very selective," he said. "When this opportunity came with NIH, I knew it was meant to be. This is it! What we're doing here is amazing work."

To the NIH community, Kilgore reminds everyone to stay vigilant and be careful with whom you interact.

"Be cognizant of individuals who contact you over email or social media," Kilgore said. "Be aware of who you're talking to and sharing information with. We advance science by collaboration; we just have to make sure we know who is seeking to collaborate with us."

Kilgore is grateful for the opportunity to help keep NIH safe.

"I wanted to do something where I feel like I'm really making a difference," he said, adding that everyone at NIH should feel proud of their contributions. From the janitor to the mail carrier to the program officer, everyone at NIH "plays a part in bringing about new science. We all play a role in bringing about change that affects the world."



Doorway to NIH: Informally known as "the badging office," every NIH'er walks through these doors in Bldg. 31 to first receive or renew their PIV cards. "I meet everyone starting their career here at NIH," said Kilgore.
PHOTO: CHIA-CHI CHARLIE CHANG

Nutrition

CONTINUED FROM PAGE 1

PHOTO: PANUSHOT/SHUTTERSTOCK

dietary exposures on health outcomes across the lifespan.

Addressing these and other related questions will enable effective policy development and help promote transparency about the foods we eat and how those foods can impact our health.

"The FDA is focusing resources on the greatest contributors to the staggering health care crisis: chronic diseases," said FDA Commissioner Dr. Martin Makary. "Mirroring the highly successful FDA and NIH Tobacco Regulatory Science Program, we're bringing together scientific expertise from both agencies to transform nutrition and food-related research."

The FDA will provide its expertise in regulatory science. NIH will provide the infrastructure for the solicitation, review and management of scientific research. The initiative will convene experts in multiple disciplines—including chronic disease, nutrition, toxicology, risk analysis, behavioral science and chemistry—with the goal of advancing nutrition and food science.

"Nutrition has always been a priority at NIH," said NIH Director Dr. Jay Bhattacharya. "By teaming up with the FDA, we're taking a major step toward answering big questions about how food affects health—and turning that science into smarter, more effective policy. It's time to tackle the chronic disease crisis head-on. That's why NIH is making this investment alongside the FDA."

NCI Biostatistics Investigator Retires

BY JENNIFER LOUKISSAS

Dr. Philip S. Rosenberg, senior investigator in NIH's National Cancer Institute (NCI) Biostatistics Branch, retired in May after 37 years of federal service. Rosenberg is an internationally recognized expert in statistical approaches to study cancer surveillance and survival. He created numerous methods and tools, including the new age-period-cohort model and web tool, proportional hazards models for comparative APC analysis and methods to forecast the future burden of cancer.

Dr. Philip Rosenberg

In partnership with scientists in the Clinical Genetics Branch, Rosenberg developed approaches to investigate cancer risk in patients with inherited bone marrow failure syndromes.

As co-principal investigator on a series of descriptive studies of breast cancer, Rosenberg identified secular trends in prognosis, underlying causes of racial disparities and etiological heterogeneity of tumors. His methods were also used to establish etiological heterogeneity for other cancers, including hairy cell leukemia, Burkitt Lymphoma and non-cardia gastric cancers.

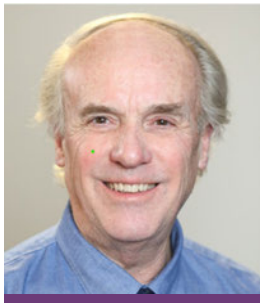
Rosenberg developed critical statistical approaches to analyze candidate GWAS (genome-wide association study) findings and pathways involving vitamin D metabolism, cell differentiation, apoptosis and lipid peroxidation, in collaborations across the division.

Rosenberg received a Ph.D. in biostatistics from Yale University. He joined the NCI in 1988 as a staff fellow.

His work has been recognized with the Howard W. Temin Award for his contribution to the developing statistical methods to monitor trends in HIV, and NIH Merit Awards for his collaborative work on inherited bone marrow failure syndromes; pioneering methods and software tools to identify candidate genes and pathways; and methods to monitor the AIDS epidemic and contribute to understanding the epidemic trends of HIV.

NIH Remembers Beck

BY MERCEDES RUBIO AND BRUCE FUCHS



Dr. Tony Beck

Dr. L. Tony Beck died of natural causes on April 7 while on the NIH campus. He was 78 years old.

He was on his way to the job that defined the later part of his career—the program director for the Science Education Partnership Award (SEPA) program. He also oversaw the STEM interactive digital media small business (SBIR/STTR) and the IDeA Networks of Biomedical Research Excellence (INBRE) programs for the National Institute of General Medical Science.

Beck began his NIH career in 2000 as a scientific review officer at the National Institute on Alcohol Abuse and Alcoholism (NIAAA). He moved to the National Center for Research Resources (NCRR) and assumed responsibility for the SEPA program, continuing SEPA when it was later relocated to the Office of Research Infrastructure Programs (ORIP) in the Office of the Director (OD). While at NCRR, he also managed the Clinical and Translational Science Awards (CTSA) and Human Embryonic Stem Cell Infrastructure programs.

Beck earned a bachelor's and master's degree in biological sciences at the University of California, Riverside, and a Ph.D. in cell and molecular biology from the University of California, Irvine. He conducted postdoctoral research at the University of Colorado Health Sciences Center and the Eleanor Roosevelt Institute for Cancer Research.

Perhaps Beck's most fulfilling role at NIH was his work in science education. He was devoted to SEPA—which supports pre-kindergarten through grade-12 educational activities in and outside the classroom in science, technology, engineering and math (STEM). He developed expertise in effective approaches for K-12 STEM education and informal education activities to accelerate the learning of complex science concepts.

Beck is survived by his sister Bonnie, brother Michael, a niece and two nephews. Videos, along with scanned sympathy cards, and additional photos of Beck can be viewed at https://bit.ly/3EXfUZr. You can learn more about his contributions by visiting the NIGMS Feedback Loop Blog: https://go.nih.gov/GD65vfP.

Beck with his first car: a Ford Model A modified in the style of a "hot-rod"

Getting Around By Shuttle

Shuttle driver Alfredo Cerna rides past Bldg. 1.

PHOTO: CHIA-CHI CHARLIE CHANG

Have a question about some aspect of working at NIH? You can post anonymous queries by clicking on the Feedback tab at https://nihrecord.nih.gov/ and we'll try to provide answers.

Feedback: Hi. I read the article about the return to office. With parking at a premium, has anyone considered running shuttles from the east side of Metro's Red line at stations like Glenmont, Forest Glen or Silver Spring to Medical Center? For many of us who live on this side, it's not economical to ride into DC and back out or take the Metro to Silver Spring station and transfer to the J2.

Response from the Office of Research Services (ORS):

Thank you for your inquiry regarding the use of government funds to provide shuttle services for employees commuting to and from public Metrorail stations.

Please note that NIH shuttles are used specifically as circulators between NIH facilities, supporting work-related travel between NIH buildings and properties. They are not intended for home-to-work commuting.

While we understand and appreciate the challenges employees face with commuting, federal law generally prohibits the use of appropriated funds for home-to-work transportation, as commuting is considered a personal expense under 31 U.S.C. § 1344(a).

There is a limited exception under 31 U.S.C. § 1344(g) that permits federal agencies to provide shuttle service between a federal worksite and a mass transit facility—but only when there is no safe, reliable and accessible public or commercial transportation available. Even in those cases, the agency must demonstrate that the service is cost-effective, fully justified and formally authorized in writing by the agency head.

While public transit options may not always be the most convenient, they are available.

Report Reveals Cancer Deaths Continue to Decline

Overall death rates from cancer declined steadily among both men and women from 2001 through 2022, even during the first two years of the Covid-19 pandemic, according to the 2024 Annual Report to the Nation on the Status of Cancer.

Among men, overall cancer incidence, measured as the rate of new cancer diagnoses, decreased from 2001 through 2013 and then stabilized through 2021. Among women, overall cancer incidence increased slightly every year from 2003 through 2021, with the exception of 2020. The report was recently published in *Cancer*.

Progress in reducing cancer deaths overall is largely the result of declines in both incidence and death rates for lung cancer and several other smoking-related cancers. New diagnoses and deaths from lung cancer, for example, have declined in both men and women over the past 20 years. Meanwhile, the incidence of cancers associated with obesity has been rising. These include female breast, uterus, colon and rectum, pancreas, kidney and liver cancers.

The report revealed that new diagnoses of breast cancer gradually increased over the study period, but the overall breast cancer death rate decreased.

Cancer death rates in children declined steadily over the study period; those for adolescents and young adults also declined until recently, when the decline slowed and stabilized.

From 2018 to 2022, cancer deaths decreased for each major racial and ethnic population group. From 2017 to 2021, (excluding 2020), cancer incidence was stable among men—but increased among women—in each major racial and ethnic population group. During the same time period, among men, incidence was highest in non-Hispanic Black men; among women, incidence was highest in American Indian and Alaska Native women.

The report also included an analysis of the Covid-19 pandemic's impact on observed cancer incidence for the first two years of the pandemic. Cancer incidence declined sharply in 2020, likely due to pandemic-related disruptions in health care, but returned to pre-pandemic levels by 2021. The magnitude of the 2020 decline was similar across states, despite variations in Covid-19 policy restrictions. The researchers noted these findings underscore the importance of providing access to health care, even during public health emergencies, to ensure timely diagnosis of cancer.

The Annual Report to the Nation on the Status of Cancer is a collaborative effort among NIH's National Cancer Institute (NCI), the Centers for Disease Control and Prevention (CDC), the American Cancer Society (ACS) and the North American Association of Central Cancer Registries (NAACCR).

For more about the report, see: https://seer.cancer.gov/report_to_nation/.

Infant with Rare, Incurable Disease Receives Personalized Gene Therapy

NIH-funded research at work: Dr. Kiran Musunru (l) and Dr. Rebecca Ahrens-Nicklas (r) led the group of researchers from Children's Hospital of Philadelphia and Penn who developed a personalized treatment for baby KJ.

PHOTO: CHILDREN'S HOSPITAL OF PHILADELPHIA

An NIH-supported research team has developed and safely delivered a personalized gene-editing therapy to treat an infant with a life-threatening, incurable genetic disease. Baby KJ, who was diagnosed with the rare condition carbamoyl phosphate synthetase 1 (CPS1) deficiency shortly after birth, responded positively to the treatment.

The process, from diagnosis to treatment, took only six months and marks the first time the technology has been successfully deployed to treat a human patient. The technology was developed using a platform that could be tweaked to treat a wide range of genetic disorders and opens the possibility of creating personalized treatments in other parts of the body.

The research team developed the customized therapy using the gene-editing platform CRISPR. They corrected a specific gene mutation in the baby's liver cells that led to the disorder. This is the first known case of a personalized CRISPR-based medicine administered to a single patient. It was designed to target non-reproductive cells so changes would only affect the patient.

CPS1 deficiency prevents the liver from fully breaking down protein byproducts, causing toxic levels of ammonia accumulation. Treatment includes a low-protein diet until the child is old enough for a liver transplant. However, in this waiting period, there is a risk of rapid organ failure. High levels of ammonia can cause coma, brain swelling and may be fatal or cause permanent brain damage.

Baby KJ received a very low dose of the therapy at six months old, then a higher dose later. The therapy was effective almost from the start: he began taking in more dietary protein, and the care team could reduce the medicine needed to suppress ammonia levels. He also weathered two unrelated illnesses that could have been extremely dangerous without the gene therapy.

Much work remains, but the researchers are cautiously optimistic about the baby's progress. The scientists described the study in *The New England Journal of Medicine.*

NIH Researchers Discover Changes Associated with Higher Breast Cancer Risk

NIH researchers have identified a series of changes in the architecture and cell composition of connective tissues of the breast, known as stromal tissue, associated with an increased risk of developing aggressive breast cancer among women with benign breast disease, and poorer rates of survival among women with invasive breast cancer. This process, called stromal disruption, could potentially be used as a biomarker to identify women who are at high risk of developing aggressive breast cancers, and those with breast cancer at increased risk of recurrence or death.

Such insights could inform new cancer prevention and treatment strategies that target the stromal microenvironment. Stromal disruption is inexpensive to assess and could be widely adopted, particularly in low-resource settings.

The researchers used machine learning to detect subtle changes in the stroma of 4,023 donated samples of healthy breast tissue, 974 biopsies of tissue with benign breast disease, and 4,223 biopsies of tissue with invasive breast cancer.

In women who donated healthy breast tissue, the same risk factors associated with aggressive breast cancer were also associated with increased stromal disruption, suggesting those risk factors may share a common stromal tissue pathway.

In women with benign breast disease, substantial stromal disruption on biopsy was associated with a higher risk of developing aggressive breast cancer and more rapid onset of breast cancer. In women with invasive breast cancer, increased stromal disruption was associated with more aggressive disease phenotypes and poorer survival outcomes.

Additional studies are needed to determine whether lifestyle changes and anti-inflammatory medications might reduce aggressive breast cancer risk, particularly among high-risk women.

NIH'ers Roll In on Bike to Work Day

PHOTOS: MARLEEN VAN DEN NESTE

On May 15, after two rainy days, the skies cleared and local roads filled with cyclists. That day, some NIH'ers commuted into work on their bicycles as part of the Washington area's Bike to Work Day and dropped by the NIH pitstop behind the Natcher Bldg.

Each year, Bike to Work Day promotes not only physical fitness but also environmentally friendly commuting by reducing traffic congestion and carbon emissions caused by driving. This year's NIH event was co-sponsored by the Office of Research Services (ORS) Division of Amenities and Transportation Services (DATS), NIH Police and Recreation & Welfare (R&W) Association.

Each year, on Bike to Work Day, the NIH Bicycle Commuter Club presents the Carl Henn Bicycling Advocacy Award to an avid cyclist. The award honors the memory and legacy of longtime NIH employee and cycling advocate Henn, a co-founder and president of NIHBCC who passed away unexpectedly in 2010. This year's honoree is Sarah "Sally" Fowler.

NIH Police encourage cyclists to register their bikes.

"Thanks to Carl and many others, NIH has a strong history of supporting biking—which makes sense," said Fowler, an NIH research nurse specialist. "As the nation's premier research facility, we should be an example to the nation for healthy commuting lifestyles.

"The benefit to the environment by bicycling can best be summed up by the motto found on the NIH Bike Club jersey, which reads: 'Non-Polluter Commuter,'" Fowler said. "Bicycling is a big part of the culture here at NIH and all NIH bicycle commuters can consider themselves members of the club."

To learn more about the NIHBCC, visit: https://www.nihbike.com/.

Above l, Clinical Center Research Nurse Specialist Sally Fowler proudly displays her Henn award; above r, NIHBCC President Caleb Darden with Steven Friedman, Stuart Kern and Fowler

Members of the NIHBCC pose with other NIH cyclists and event volunteers outside the Natcher pitstop. **PHOTOS: MARLEEN VAN DEN NESTE**