

## Fellows Vote to Unionize

NIH Fellows United Becomes First-ever Trainee Union in a Government Agency

BY JENNIFER HARKER, *THE NIH CATALYST*

SOME 5,375 NIH EARLY-CAREER researchers have formed a union. The vote to establish the NIH Fellows United-UAW union was certified by the U.S. Federal Labor Relations Authority in December. Of the approximately 1,700 NIH fellows who voted, 97.8% voted in favor of the union.

This is the first union of its kind in the U.S. federal government. The NIH Fellows United-UAW union will cover, to varying degrees, postbaccalaureate, predoctoral, postdoctoral, research, and clinical fellows working at NIH.

“Thousands of fellows came together to vote for our union, and we will continue to work together as we prepare to bargain for fair and equitable working conditions,” said **Dustin Mullaney**, a postbaccalaureate fellow at NINDS, in an NIH Fellows United press release shared with the *Catalyst*.

A statement from the NIH Office of Communications and Public Liaison noted, “NIH appreciates the democratic process that unfolded with the recent vote, and we respect the decision made by the employees to form a union. NIH will engage in meaningful discussions with union representatives to better understand their members’ needs and aspirations.”

The union vote took place in person on Dec. 6 for fellows working in Bethesda, Rockville, and Baltimore. Fellows at satellite

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## CONFIRMED: Bertagnolli Named Director

BY THE NIH CATALYST STAFF



CREDIT: CHIA-CHI CHARLIE CHANG

NIH Director Monica Bertagnolli held an agency-wide Town Hall Dec. 19 where she and Lawrence Tabak sat down for a fireside chat. The Masur Auditorium was packed full of NIHers for the first time since the 2020 COVID-19 pandemic.

**MONICA M. BERTAGNOLLI IS THE 17TH DIRECTOR OF NIH. NOMINATED BY** President Biden, Bertagnolli was confirmed by the U.S. Senate on Nov. 7 and sworn in on Nov. 9. She is the second woman and first surgeon to hold the position.

“Dr. Bertagnolli is a world-class physician-scientist whose vision and leadership will ensure NIH continues to be an engine of innovation to improve the health of the American people,” said President Biden in his nomination announcement in March 2023.

Bertagnolli transitions from her role as NCI director and replaces **Lawrence A. Tabak**, who had been selected by U.S. Department of Health and Human Services Secretary

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## A Time of ReNEWal

BY NINA F. SCHOR, DDIR

**THE NEW YORK TIMES LEARNING** Network posts a “Word of the Day.” *The NIH Catalyst* comes out bimonthly or every 60 days, though, so I write this column to tell you that the NIH word of this first issue of the *Catalyst* in this new year of 2024 is “new” because new things abound!

NIH welcomed a new director. **Monica Bertagnolli** has come to her new role as NIH director from the National Cancer Institute, where she served as the 16th NCI director for one year. She is passionate about bringing science to bear on the health and well-being of all people and about re-establishing trust in and appreciation of science and medicine in the public.

Bertagnolli is a surgical oncologist who came to NIH in 2022 from Harvard’s Dana Farber Cancer Institute (Boston, Massachusetts). She grew up on a cattle ranch in Wyoming, where she saw firsthand the challenges faced by rural communities to access medical care and participate in medical research. She majored in engineering at Princeton University (Princeton, New Jersey) before pursuing her medical studies at the University of Utah (Salt Lake City, Utah). Director Bertagnolli is well acquainted with and invested in the NIH Intramural Research Program and, especially, its people!

President Biden also has named a new NCI Director, **W. Kimryn Rathmell**. Rathmell comes to NIH from Vanderbilt University (Nashville, Tennessee), where she was professor and Hugh Jackson Morgan Chair in the Department of Medicine. She is a medical oncologist and cancer biologist

who majored in biology and chemistry at the University of Northern Iowa (Cedar Falls, Iowa) and pursued her medical and doctoral degrees in biophysics at Stanford University (Stanford, California).

Rathmell is a renowned expert on the genetics and molecular biology of complex renal cancers and a member of The Cancer Genome Atlas Program. She also played important leadership roles at Vanderbilt in biomedical education, training, and career development.

And there’s more! The past year brought us several new scientific and clinical directors; newly tenured senior investigators; new Stadtman, Lasker, distinguished, and independent research scholars; new assistant clinical investigators, staff clinicians, and staff scientists; and new fellows, trainees, and students.

As if that weren’t enough, we have nine newly named NIH Distinguished Investigators.

- **Emily Chew** (NEI)
- **Francis Collins** (NHGRI)
- **Mariana Kaplan** (NIAMS)
- **Daniel Levy** (NHLBI)
- **Luigi Notarangelo** (NIAID)
- **Julie Segre** (NHGRI)
- **Robert Tycko** (NIDDK)
- **Richard Youle** (NINDS)
- **Keji Zhao** (NHLBI)

Congratulations to each and every one of you at every career level and from every institute!

On a note that is of direct and critical relevance to this column and everything in the print and pictures around it, *The NIH Catalyst* welcomed **Jennifer Harker**

as its new managing editor. Harker joins the Office of Intramural Research division of communication from the NIEHS, where she was a technical writer-editor. She earned her undergraduate degrees at Amarillo College (A.S. in journalism) and Arizona State University (B.A. in sociology) and obtained her master’s degree in communication at West Texas A&M University (Canyon, Texas).

Harker then earned her doctorate in mass communication with an emphasis in strategic communication at the University of North Carolina at Chapel Hill (UNC-CH). She has served as an assistant professor at West Virginia University (Morgantown, West Virginia) and as adjunct faculty at UNC-CH. Harker has been an author, a graduate thesis mentor, and a lecturer in sport communication, as well, so we are indeed fortunate to have garnered her for our *Catalyst* team!

We are also in the midst of a new Continuing Resolution, which, for whatever sense of “marking time” it brought, prevented a government shutdown. Gratitude and relief are the only appropriate responses!

There is one more “new” for this column: re-*NEW*-al. I hope all of you have come to your work at NIH after the winter break and holiday season refreshed and with renewed vigor and commitment to all that science, medicine, equitable community, and civility bring to us, to our country, and in this very challenging landscape, to all the world.

With thanks and very best wishes to you all for a happy, healthy, and productive New Year! ●

## Breakthrough Research

### A Showcase of 2023 NIH Scientific and Clinical Discoveries

BY THE NIH CATALYST STAFF

**CLINICAL AND SCIENTIFIC** breakthrough research presentations have become an end-of-year NIH Office of Intramural Research celebration.

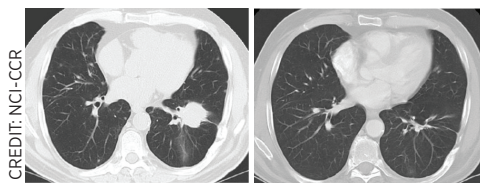
On Dec. 20, 2023, the scientific directors and clinical directors from each institute and center (IC) had three minutes and one slide to present a standout intramural research accomplishment from the past year. We highlight here some of our favorites.

#### NIA—PRESENTED BY LUIGI FERRUCCI:

Blood-brain barrier endothelial cells express proteins that can be used as plasma biomarkers to identify neurological conditions (*Stroke* 54(11):2853-2863, 2023). These biomarkers at midlife can predict a 25-year risk of dementia and Alzheimer's disease (*Sci Transl Med* 15(705):eadf5681, 2023).

PI: **Keenan Walker**, investigator in the NIA Multimodal Imaging of Neurodegenerative Disease (MIND) Unit.

#### NCI-CCR—PRESENTED BY GLENN MERLINO:



CREDIT: NCI-CCR

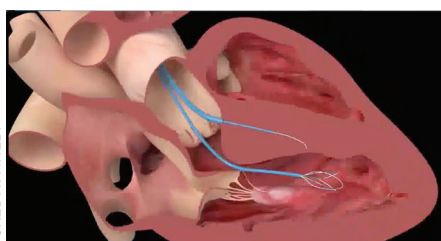
The image on the left shows an area of cancer infiltration pre-treatment, and on the right is the same area after three months of treatment.

A 30-year clinical trial at the CC showed how an immunotherapy protocol increased survival by 20 years for people with a low-grade form of lymphomatoid granulomatosis, leading to a new standard of treatment. Conversely, individuals who developed the higher-grade form of the same cancer responded better to a chemotherapy regimen. Lymphomatoid granulomatosis is a rare Epstein-Barr virus-associated B-cell

lymphoproliferative disorder with a median overall survival of less than two years (*Lancet Haematol* 10:e346-e358, 2023).

PI: **Wyndham Wilson**, senior investigator in the NCI/CCR Lymphoid Malignancies Branch.

#### NHLBI—PRESENTED BY RICK CHILDS:



CREDIT: NHLBI

Access this article online at <https://irp.nih.gov/catalyst> and watch a video of SESAME in action.

The SESAME, or SEptal Scoring Along Midline Endocardium, is a new transcatheter electrosurgery technique to treat hypertrophic cardiomyopathy. First tested in animals (*Circ Cardiovasc Interv* 15:e011686, 2022), and then humans (*Circ Cardiovasc Interv* 15:e012106, 2022) by cardiologists at Emory University, SESAME replaces open heart surgery with a less invasive transcatheter electrosurgery that allows a cardiologist to navigate guidewires through the septal myocardium to accomplish longitudinal slicing (myotomy) of the heart muscle. The new technique might have implications for other types of non-surgical heart procedures in the future.

PI: **Robert Lederman**, senior investigator of the NHLBI Cardiovascular Intervention Laboratory.

#### NIBIB—PRESENTED BY RICHARD LEAPMAN:

Using bioscaffolds regulates healing and tissue regeneration after injury better than synthetic devices by co-opting healing pathways also used by tumors to avoid destructive autoinflammation (*Nat Mater*



CREDIT: NCI

Meredith Shiels



CREDIT: NIBIB

Kaitlyn Sadtler

DOI:10.1038/s41563-023-01689-9, 2023). These biomaterials could one day be used for regenerative medicine immunotherapies and therapeutic wound healing vaccines.

PI: **Kaitlyn Sadtler**, Stadtman investigator in the NIBIB Section on Immunoengineering.

#### NCI-DCEG—PRESENTED BY STEPHEN CHANOCK

NIH researchers and collaborators estimated trends in U.S. cancer mortality between 2000–2019 for the six leading types of cancers: lung, colorectal, pancreas, breast, prostate, and liver; as well as all other cancers (*Cancer Discov* 13:1084-1099, 2023). Age-standardized cancer mortality rates declined 2.3% per year over that time period, but will need to increase to 2.7% per year in order to reach the Cancer Moonshot Initiative's goal to reduce age-standardized cancer mortality rates by at least 50% over the next 25 years. The study identified the most promising and realistic opportunities to increase those percentages.

Relatedly, NIH Director Monica Bertagnoli published a commentary that accompanies the research article (*Cancer Discov* 13:1049-1052, 2023).

PI: **Meredith Shiels**, senior investigator in the NCI-DCEG Infections and Immunoepidemiology Branch. ●

Read a full list of the 2023 NIH IC Scientific and Clinical Discoveries online at <https://irp.nih.gov/catalyst>.



## New Environmental Justice and Health Interest Group

### Fellows Unionize

CONTINUED FROM PAGE 1

NIH sites began voting by mail in November.

### Next steps

**Marjorie Levinstein**, IRTA postdoctoral fellow in the Biobehavioral Imaging and Molecular Neuropsychopharmacology Laboratory at NIDA, said the NIH Fellows United initiative began in July 2021. Levinstein said she and another NIH postdoc hosted the first interest meeting, as both had previously attended universities when graduate students and postdoctoral fellows unionized through UAW.

“This effort was completely fellow driven,” Levinstein said. “I was ecstatic at how 97.8% voted in favor of the union, which is a clear indication of how much fellows want to be able to have a say in their terms of employment.”

Fellows can choose whether or not they wish to join the union; however, regardless of whether they do so, they will be included in the bargaining unit represented by the NIH Fellows United-UAW, according to Levinstein.

A survey will be sent to all NIH fellows to gauge interest in their priorities for bargaining. Then, NIH and the union will negotiate terms. A bargaining committee elected by the union will be established to represent the fellows throughout the negotiation process.

Levinstein noted that the following topics, commonly brought up by fellows as areas for improvement, are likely to be included in new contract negotiations between NIH and the newly formed NIH Fellows United-UAW union:

- **Pay:** The union plans to advocate for fair pay across all Institutes and Centers (ICs) at each trainee or fellow level. Levinstein recognized NIH’s recent approval and rollout efforts toward standardizing pay

across ICs but noted that rollout has been inconsistent. They hope to codify the standardized pay agreement across NIH ICs.

- **Benefits:** Consistent childcare and retirement benefits are likely to be included on the list of benefit requests.
- **Added support:** The union hopes to negotiate and establish a formal grievance process with third-party arbitration.
- **International fellows’ visas:** International fellows must renew visas every year. Levinstein said this causes added stress because international fellows must take time away from work to return to their home country to renew the visa each year. The union hopes to extend this time interval for longer than one year to decrease the strain.

“We hope to have our contract finalized by this summer,” said Levinstein, adding that fellows will not be charged dues until the first contract is ratified.

Trainings will be provided for NIH managers beginning in January, according to **Beth Chandler**, deputy director, NIH Office of Human Resources. A 30-minute training offered by HHS is available for managers who would like to brush up on the high-level points of Labor Relations 101, she said [*internal only*]. ●

Answers to frequently asked questions about the NIH Fellows United-UAW union, including how union contract bargaining might work for short-term fellows (2–3 years of employment), are available at <https://www.nihfellowsunited.org/faq/>.

Additionally, the NIH Office of Intramural Training and Education, accessible at <https://www.training.nih.gov/>, offers a repository of resources and contacts for NIH fellows, as well as professional trainings, wellness events, job listings, and more.



CREDIT: NIEHS

**THE NEW ENVIRONMENTAL JUSTICE** and Health Interest Group (EJHIG) will serve as a platform to learn about various environmental justice (EJ) issues and efforts in research and community outreach. This Scientific Interest Group (SIG) aims to promote and support cross-NIH collaboration in environmental health equity research, advance methods in EJ research, and incorporate EJ frameworks into transdisciplinary research.

The EJHIG also looks to bring together EJ investigators from both intramural and extramural communities and will include trainees and early career investigators from multiple NIH ICs, including NCI, NIEHS, NIAID, NIDDK, NINDS, and OD. EJHIG events are open to all NIH community members.

The EJHIG is co-organized by **Jennifer Ish** (NIEHS), **Jongeun Rhee** (NCI), and **Maya Spaur** (NCI), with **Chandra Jackson** (NIEHS) serving as advisor. For more information, go to <https://oir.nih.gov/sigs/environmental-justice-health-interest-group> or contact Jennifer Ish, at [jennifer.ish@nih.gov](mailto:jennifer.ish@nih.gov).

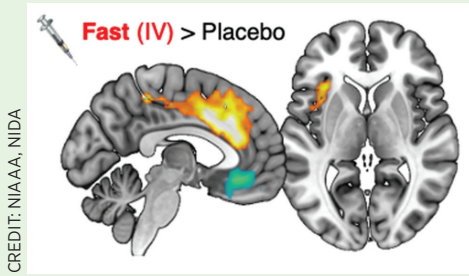
### A Sampling of SIGs

- 3D Printing and Modeling
- Bioinformatics
- Dietary Supplement
- DNA Repair
- Genetic Counseling
- Pancreatic Cancer
- Pediatric Clinical Research
- Science of Science Communication
- Virtual and Augmented Reality

See a full list at <https://oir.nih.gov/sigs>.



## Intramural Research Briefs



CREDIT: NIAAA, NIDA

**NIAAA, NIDA, CC:** Whole-brain analysis showing the salience network (orange and yellow) where brain activity was significantly associated with fast dopamine increases after intravenous administration of methylphenidate—an effect not observed with oral administration of methylphenidate.

### NIAAA, NIDA, CC: BRAIN NETWORK IS UNIQUELY ACTIVATED THROUGH INTRAVENOUS DRUG USE

A team of NIAAA and NIDA researchers at the NIH CC found that intravenous drug administration activates brain regions within the salience network, a neural system responsible for gauging the euphoric effects of a drug. When the same drug was administered orally, the network remained inactive, representing a new discovery in addiction neuroscience.

Using simultaneous positron-emission tomography (PET) and functional magnetic-resonance imaging (fMRI), investigators recorded the brain activity, dopamine signaling, and self-reported feelings of euphoria from 20 participants across three clinical sessions in which intravenous and oral methylphenidate (Ritalin) or a placebo were administered. The researchers found that two salience-network brain regions were activated in association with the fast dopamine increases to intravenous methylphenidate: the dorsal anterior cingulate cortex and the insula. Participants also reported euphoric effects after intravenous use, which were described as more intense when those regions were more active. These effects were not observed in PET or fMRI imaging with the oral administration of methylphenidate, even when the same peak concentration of dopamine was reached.

Routes of administration that get drugs to the brain fast, such as intravenous injection,

maximize the rewarding effects, which makes drugs more reinforcing and in time can lead to more severe addiction. According to the authors, if the salience network can be inhibited during quick drug administration, then it may block the drug's euphoric effects, giving more insight into the course of addiction and presenting an intriguing new treatment target. (NIH authors: P. Manza, D. Tomasi, E. Shokri-Kojori, R. Zhang, D. Kroll, D. Feldman, K. McPherson, C. Biesecker, E. Dennis, A. Johnson, W. Wang, M. Yonga, G. Wang, and N.D. Volkow, *Nat Commun* 14:6408, 2023; DOI:10.1038/s41467-023-41972-6)

[BY MEAGAN MARKS, NIAAA]

### NHGRI: FAILING TO ACCOUNT FOR MIXED GENETIC LINEAGES COULD LEAD TO INACCURACIES

Not fully accounting for genomic variance in a population may lead to inaccurate study results, according to new research led by NHGRI scientists. When broadly sampling people of European ancestry, the researchers found two false associations involving the lactase gene (which gives people the ability to digest lactose): one between lactase and height, and the other between lactase and cholesterol concentrations.

Using data published in genetic-association studies, the NHGRI team created a new reference panel that captured genomic diversity not previously seen in people of European ancestry. By using the new reference panel, they revealed the inaccurate associations and in contrast, found a genuine true-positive association between the lactase gene and body mass index.

Information about how genomic variants are related to different traits helps researchers estimate polygenic risk scores and may give clues about a person's ability to respond safely to drug treatments. The new findings highlight the importance of accounting for mixed ancestral backgrounds in genomic studies. According to the authors, it's likely that there

are other false associations in the literature and that some true associations are yet to be found. (NIH authors: M.H. Gouveia, A.R. Bentley, A.A. Adeyemo, C.N. Rotimi, and D. Shriner, *Nat Commun* 14:6802, 2023; DOI:10.1038/s41467-023-42491-0)

[BY CODY R.K. CONRAD, NIAID]

### NIDA: OVERDOSE MORTALITY INCREASED IN PREGNANT AND POSTPARTUM WOMEN

In a cross-sectional study of national mortality data, NIDA researchers found that, from early 2018 to late 2021, mortality from drug overdose among pregnant and postpartum people aged 35 to 44 more than tripled, from 4.9 deaths to 15.8 deaths per 100,000 mothers.



Emily Einstein

CREDIT: GEORGETOWN UNIVERSITY

The investigators also found that individuals who died from overdose were more likely to be younger, be non-college graduates, and be unmarried compared with people who died of obstetric causes. They were also more likely to have died at home or other non-healthcare setting, consistent with the phenomenon that overdose deaths often occur in drug-consumption locations. According to the authors, these findings indicate the need for strengthening community outreach and maternal medicine support and point to barriers in pregnant individuals seeking treatment, such as socioeconomic resources, stigma, and fear of loss of child custody.

“These results reflect the persistent national overdose crisis and demonstrate that pregnancy is an urgent time for interventions that can reduce the risk of overdose,” said NIDA Science Policy Branch Chief and study co-author Emily Einstein in a press release. (NIH authors: B. Han, W.M. Compton, E.B. Einstein, E. Elder, and N.D. Volkow, *JAMA Psychiatry* DOI:10.1001/jamapsychiatry.2023.4523) ●

[BY NAOMI GREENBERG, NHLBI]

Read more online at <https://irp.nih.gov/catalyst/32/1>.

## This Is Your Heart on Stress

The Heart-Brain Connection, Multisystem Research, and Neurobiological Resilience

BY MICHAEL TABASKO, *THE NIH CATALYST*



CREDIT: AHMED TAWAKOL

Ahmed Tawakol uses a multisystem, multidisciplinary approach to research that shows how stress wreaks havoc on the body, and he is studying how lifestyle interventions can help.

**SAGE ADVICE FROM DOCTOR TO** patient warns of unmanaged stress. The famed INTERHEART study published in 2004 linked increased incidence of heart attacks to psychosocial stress factors in thousands of study participants (*Lancet* 364:953–962, 2004).

More recently, researchers have found the attributable risk of stress on the heart to be particularly potent, on par with smoking, hypertension, and diabetes (*Circ Cardiovasc Imaging* 13:e010931, 2020).

But precisely how does stress—intangible and omnipresent—infiltrate our very fabric, and how can we stop it? Ahmed Tawakol proposed some answers at the 2023 Stephen E. Straus Distinguished Lecture in the Science of Complementary Therapies, Dec. 6, sponsored by NCCIH.

Tawakol is director of Nuclear Cardiology and co-director of the Cardiovascular Imaging Research Center at Massachusetts General Hospital and associate professor of Medicine at Harvard Medical School (Boston).

He and his collaborators take a whole-person approach to research and have pioneered imaging techniques that exquisitely show how stress manifests across multiple organs. “One of the keys

to pursuing multisystem research is to make sure your team has broad expertise,” said Tawakol, a cardiologist who leans on guidance from collaborators including neurologists, psychologists, hematologists, and brain-imaging experts.

Leveraging those relationships, Tawakol’s team was the first to associate stress-associated brain activity in humans to cardiovascular disease events, such as heart attacks and strokes, and is testing how lifestyle interventions can be powerful treatment tools.

### The enigmatic amygdala

For an external stressor—such as noise, danger, or the dreaded public speaking event—to trigger stress in the body, it first needs to be registered as a threat. That’s brokered primarily in the amygdala, our brain’s main emotion-processing center.

Using positron emission tomography in combination with computed tomography (PET/CT), Tawakol found that people experiencing stressors such as financial insecurity or chronic unhealthy noise exposure, or who had chronic anxiety disorders or depression, had heightened amygdalar activity. The degree to which this stress-related brain activity was elevated in turn strongly predicted the risk for and even the timing of subsequent cardiovascular disease events, even after adjusting for other risk factors.

Probing a pathway previously found in mice, Tawakol then used PET/CT to show that stressed individuals also had elevated immune activity in the bone marrow which correlated with increased arterial inflammation and plaque formation (*Lancet* 389:834–845, 2017).

“This supports a model that stress, through activation in the amygdala, stimulates the bone marrow [via sympathetic nerves], which increases arterial

inflammation and leads to cardiovascular events,” said Tawakol, who cited several studies confirming this pathway, including one with former NHLBI Lasker Clinical Research Scholar Nehal Mehta (*JACC Cardiovasc Imaging* 13:465–477, 2020).

### The neuroimmune arterial axis

Importantly, “amygdalar activity” is calculated as a ratio of activity in the amygdala relative to counter-regulatory signals from the prefrontal cortex (PFC), which placates an active amygdala. “It’s all about balance,” said Tawakol.

In other words, if the PFC deems the amygdala has gone rogue, the PFC can send signals to calm it and mute the inflammatory cascade. Those with a healthy balance between the amygdala and PFC are considered neurobiologically resilient because stress activity is lower despite being exposed to stressors.

Conversely, Tawakol presented evidence where people who had routine amygdalar activity, but lower PFC regulation, still had an elevated risk of cardiovascular disease compared with their counterparts with effective cortical regulation (*Circulation* 146:A14065, 2022). This regulatory balancing act may have impacts beyond the heart, too. Brain scans have shown an association between amygdalar activity and survival from head and neck cancers (*PLoS One* 18:e0279235, 2023).

In another study that Tawakol suggested may hint at a future area of research, scientists demonstrated in a mouse model that sympathetic neural connections from the amygdala terminated near atherosclerotic plaques. When those circuits were interrupted, the plaque sizes reduced, showing how the peripheral nervous system may interact directly with diseased arteries (*Nature* 605:152–159, 2022).

Stress can also affect us acutely. Tawakol



## Stephen Straus' Legacy, Multisystem Research at NCCIH

Stephen Straus was the first director of NCCIH. “Straus championed efforts to establish the efficacy and safety of complementary and integrative health practices while upholding NIH’s rigorous scientific

standards,” said NCCIH Director **Helene M. Langevin** in her opening remarks welcoming Ahmed Tawakol to this year’s Stephen E. Straus Distinguished Lecture.

Multisystem research, whole-person health, and lifestyle interventions to help ameliorate the effects of chronic stress are also being explored at NCCIH. Intramural researchers there are particularly focused on the role of the brain in perceiving, modifying, and managing pain.

Some of those integrative investigators are doing work at the NIH Pain Research Center (PRC), a multidisciplinary initiative bringing together scientists from 11 NIH institutes and centers. PRC researchers are working to identify specific pain mechanisms, determine the efficacy of nonopioid treatments, and predict individual patient response to therapies and outcomes.

For example, Lead Scientific Officer Eleni Frangos runs a collaborative study with NHLBI scientists **Swee Lay Thein**, **Matthew Hsieh**, and **Deepika Darbari** of Children’s National Hospital (Washington, D.C.) that looks at the brains and pain responses of sickle-cell patients after they receive a bone-marrow transplant or gene therapy.

Some patients continue to experience pain after receiving curative therapy. To find out why, the PRC team uses functional magnetic resonance imaging to examine how pain-related brain activity and the connectivity between various brain regions differs between sickle-cell patients who have undergone one of those procedures and healthy individuals.

pointed to a surge in recorded heart attacks after earthquakes, political elections, and consequential World Cup soccer matches (*N Engl J Med* 358:475–483, 2008).

### Fostering neurobiological resilience

Ready to de-stress? Mounting evidence is showing just how well lifestyle interventions work. Tai chi may thicken the cortical region of the brain and improve regulatory connectivity between the amygdala and PFC (*Front Med* (Lausanne) 2023; DOI:10.3389/fmed.2023.1210170). Structured breathing exercises appear very effective in calming the amygdala (*J Neurosci* 36:12448–12467, 2016).

Sleep turns out to be extremely important, especially for people genetically predisposed to stress-associated conditions like anxiety and depression. Tawakol found that these individuals were twice as likely to develop cardiovascular disease when sleep deprived compared with people with lower genetic risk (*Circulation* 148:A16298, 2023).

Exercise has long-term impact.

“Its benefits are not transient; it changes the wiring of your brain,” said Tawakol, whose imaging studies have shown that exercise works, in part, by enhancing cortical control of the stress systems. Because of those direct effects on the brain, it was particularly effective in people with pre-existing depression. Getting beyond the recommended 150–300 minutes of moderate exercise per week in individuals with depression was associated with even greater cardioprotective benefits (*Circulation* 144:A13203, 2021).

Stress-reduction techniques are showing great promise, too. Stress reduction combined with exercise in a cardiac rehabilitation group was 50% more effective in reducing future cardiac events than standard rehabilitation alone (*Circulation* 133:1341–1350, 2016). What’s more is that emerging evidence suggests that uncontrolled stress might even lower survival from cancer and increase the risk of blood clots. “We are currently doing two

studies testing stress reduction through a mindfulness intervention to see if it results in changes in the brain,” said Tawakol.

More studies are in the pipeline to uncover the mechanics behind exactly how lifestyle interventions build a stress-resistant brain and have downstream effects on bone-marrow activity and arterial inflammation. Demonstrating causation could further inform precision medicine approaches and help physicians tailor stress-fighting interventions for their patients.

Offering parting advice, Tawakol acknowledged that fitting lifestyle interventions into a busy life is no easy task. Nevertheless, he coaches his patients on just how detrimental stress is to their health and how powerful lifestyle interventions can be. “I would really try to combine techniques and prioritize the ones that work well within your life,” he said. ●

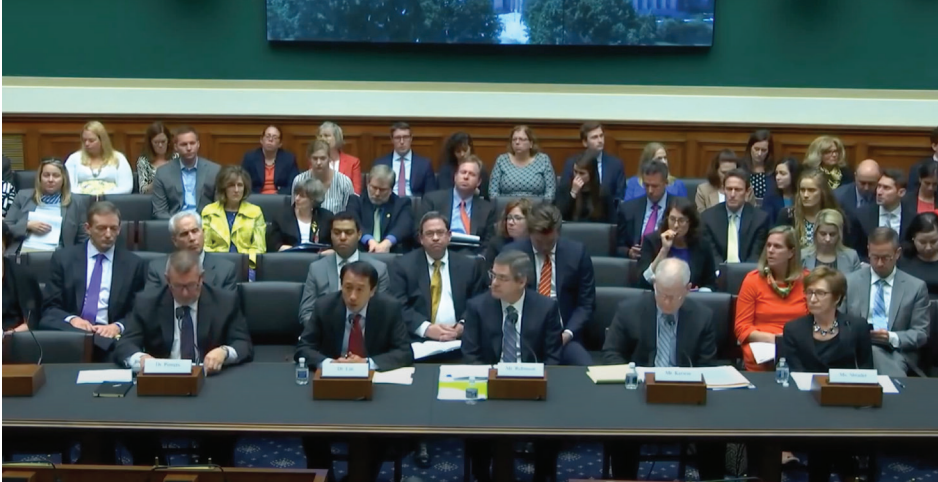
Watch Tawakol’s Stephen E. Straus Distinguished Lecture at <https://videocast.nih.gov/watch=52750>.

## Have You Heard? Hearing Aids Reduce Cognitive Decline

Frank Lin's WALs Lecture on Hearing Interventions and Brain Health

BY MEAGAN MARKS, NIAAA

CREDIT: COCHLEAR CENTER FOR HEARING AND PUBLIC HEALTH



Frank Lin is a clinician and researcher who regularly advocates policy changes that affect hearing issues. Lin is pictured here testifying in front of Congress in May, 2017.

**THIRTY YEARS AGO, FRANK LIN** attended his first Wednesday Afternoon Lecture Series (WALS) event. A high school summer intern then, he nodded off at the recitation of high-level science so dense to his young ears.

But on Nov. 15, Lin was on the other side of the WALS podium, presenting his own ground breaking discoveries in otology and discussing the use of hearing aids to slow cognitive decline.

“If I have one goal for today, it is for no one to fall asleep,” joked Lin.

A lot has changed over the past three decades when it comes to the science of hearing loss, said Lin, who now serves as director of the Cochlear Center for Hearing and Public Health and professor of otolaryngology, medicine, mental health, and epidemiology at Johns Hopkins School of Medicine and Bloomberg School of Public Health (Baltimore).

Epidemiological research led by Lin and others, for example, has established the link between hearing loss and risk of dementia, but whether hearing intervention could reduce this risk was unknown. This question was clarified with the publication

this year of the Aging and Cognitive Health Evaluation in Elders, or **ACHIEVE**, study, which found that cognitive decline may be slowed by hearing interventions in some senior cohorts.

The **ACHIEVE** study, which is funded in part by NIA and led by Lin's team, spans four research sites across the United States. The study recruited 977 adults ages 70–84 with untreated mild-to-moderate hearing loss. The **ACHIEVE** study stems from the Atherosclerosis Risk in Communities (ARIC) Neurocognitive Study, which set out to investigate cognitive impairment from midlife vascular risk factors. A portion of the participants (n = 238) from the ARIC study and other healthy community volunteers (n = 739) make up the two cohorts of the **ACHIEVE** study who have been followed since 2018.

Among the ARIC cohort, the **ACHIEVE** study's hearing interventions reduced by 48% global and domain-specific cognitive decline. The strongest association was within the language domain.

Hearing interventions may also affect brain structure. Lin's latest exploratory research findings support previous research

that indicates that hearing loss could lead to structural atrophy, or thinning, of the brain as well as functional changes. Peripheral auditory input activates neural activity, he explained. Neural activity is a networked system that operates across regions of the brain. But what is not yet known is whether long-term hearing interventions, such as the use of hearing aids, can help to reduce those functional or structural changes over time. Lin's research suggests it can.

His **ACHIEVE** study team examined cortical thinning via magnetic resonance imaging (MRI) scans at recruitment and at three years, and in the hearing intervention group, a 0.01 mm difference was measured in the frontal lobe as well as variations in thinning across the temporal, occipital, and parietal lobes.

“These very exploratory MRI results generally indicate a trend toward hearing intervention being associated with reduced cortical thinning,” Lin said. “I will be perfectly honest, when we did these analyses, we did not think we would see anything. I mean, three years is not much time, and yet there seems to be a signal that the hearing aid is doing something to the brain.”

Collectively, these patterns suggest that hearing interventions may result in sustained alterations of neural structure and activity. The potential mechanisms of this association could include direct or indirect effects, he cautioned. For example, it could be the enhancement of the sense of hearing that is affecting the brain, or it could be that enhanced hearing is allowing the individual to increase social and/or physical activity and that, theoretically, is what is affecting the brain structure. Either way, hearing loss is something that is modifiable and treatable in late life. “That is why this is really important,” he said.



## Know Your Hearing Number

**MILD TO MODERATE HEARING LOSS AFFECTS TWO-THIRDS OF PEOPLE OVER AGE 60.**

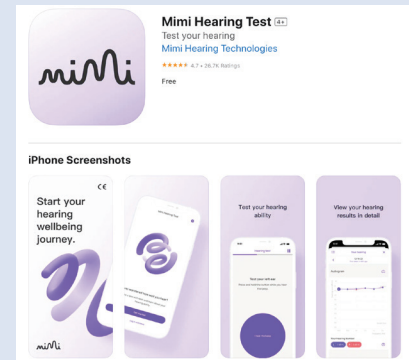
Noteworthy is the fact that Lin's work has led to improved policies and the creation of technological standards. Over the years, he has worked with policymakers and testified before Congress to aid in the passage of the 2017 Over-the-Counter Hearing Aid Act, which opened the market for competitive innovation, made the United States the first country in the world to create a regulated hearing aid market, and made hearing aids more accessible to the millions of Americans with hearing loss.

Lin also collaborated with the Consumer Technology Association to establish a standard testing methodology for a consumer-facing hearing metric (see sidebar) and to set common terminology to describe hearing wellness throughout a consumer's lifetime.

The hearing interventions offered in the ACHIEVE study, which includes hearing aids and audiologist visits, are not covered under conventional Medicare insurance provisions. Lin continues to advocate for this change. ●

*Meagan Marks is a postbaccalaureate fellow in David Lovinger's Laboratory for Integrative Neuroscience at NIAAA, where she studies motivation and reward. In her spare time, she enjoys exercising, playing the guitar, and exploring the D.C. area.*

Watch the WALS talk featuring Lin on VideoCast at <https://videocast.nih.gov/watch=51173>. Researchers of all ages attended, and all appeared to remain wide awake.



The NIH Catalyst staff downloaded and used these smartphone applications and tested our own hearing. According to the SonicCloud app, our new editor cannot hear the letter F. Do with that what you will...

"It doesn't matter who you are, me or you, our hearing is going to decline as we get older," Lin said during his WALS lecture. "It's just the way humans are built."

Even though hearing aids are becoming more accessible, there is still one foundational issue, according to Lin: Hearing is rarely tested.

"I am guessing for most people in this room, you might have gotten your hearing measured when you were six or seven, in primary school," Lin said during his presentation. "Yet, for the average American, you will never have your hearing tested again until you're 80 years old and your spouse is screaming at you to get your hearing tested because you can't hear what they are saying."

"My fundamental goal is for every teenager and adult around the world to understand, measure, and track their own hearing because enabling consumers to have access to health metrics (e.g.,

step count) can change behaviors at an unprecedented scale."

Lin suggested visiting the website, [hearingnumber.org](http://hearingnumber.org), to learn what a Hearing Number is and how to track it.

He has worked with technology companies such as Mimi and SonicCloud which create applications for Apple's iOS platform for individuals to test their hearing and learn their Hearing Number.

"You do not need to see an [otolaryngologist] or an audiologist to know your Hearing Number. Just do it yourself, using your smartphone, and track it over time," said Lin, who recommends individuals test their hearing at least once a year.

"Everything we do on a daily basis is related to communicating and hearing. Being able to monitor that over your lifetime and adapt technology strategies so you can always hear and communicate... well, it is sort of a no-brainer."

## JOIN US!

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## New NIH Director

CONTINUED FROM PAGE 1

Xavier Becerra to serve as the acting director of NIH. Tabak held the position since December 2021 when former director, **Francis S. Collins**, announced he would step down after his 12-year tenure. Tabak has agreed to resume his role as the NIH principal deputy director to assist Bertagnolli with the transition.

Concurrently, NCI Principal Deputy Director **Douglas R. Lowy**, served as NCI acting director until President Biden appointed **W. Kimryn Rathmell** as the new NCI director in December.

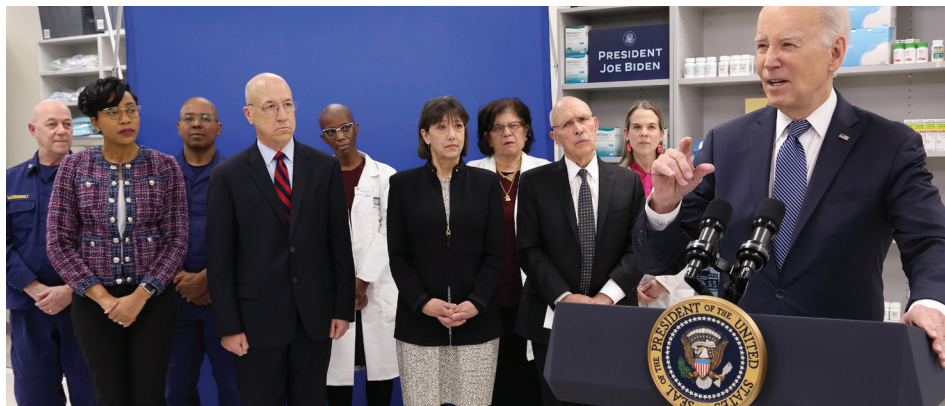
## Making rounds

Bertagnolli has been making the rounds on the NIH Bethesda campus since taking on her new role. She has performed surgery, hosted her first presidential visit, held an NIH-wide Town Hall meeting, and joined the twice-monthly scientific directors and clinical directors meeting.

At the Dec. 19 Town Hall meeting, she spoke to the NIH community about her personal career path and addressed the top three questions submitted via a poll by NIH employees. Those questions focused on workplace flexibilities, restoring the American people's trust in science, and understaffing in some departments. Bertagnolli, who grew up on a cattle and sheep ranch, remarked on the self-reliance required when living 100 miles from the nearest hospital, shared her obsession with fly fishing, and commented how her commitment to physical fitness reaches back to her undergraduate days in karate club.

Sitting down with the scientific directors and clinical directors at their Dec. 20 meeting, Bertagnolli expressed how “incredibly unique and wonderful” the NIH intramural environment is for conducting meaningful research.

“One of the things I would love to do is eliminate this friction between the basic fundamental science community and



CREDIT: CHIA-CHI CHARLIE CHANG

President Biden visited the NIH Bethesda campus on Dec. 14 to announce his plans for lowering prescription drug prices. Pictured are (front row) Sadhana Jackson, James Gilman, Monica Bertagnolli, David Mitchell; (back row) Richard DeCederfelt, Fortin Georges, Marilyn Farinre, Nadia Guirguis, and Christina Martin.

the clinical community. Those should be absolutely joined, and I think the NIH intramural program is a perfect example of this,” she told the directors. “I think you all have bought into that here and understand that deep in your bones.

“You are going to hear lots of talk from me about how I have an emphasis on clinical research,” she continued. “Please do not ever think that is because of any diminution in our commitment to basic research. It is just something that we now have the capabilities of doing with the scientific rigor that we have always wanted.”

## Leading from personal insight

The bench to bedside pipeline is something anyone who speaks with Bertagnolli is certain to hear about, and she has personally experienced both.

Chief among her key priorities is ensuring that clinical trials yield the best results. She hopes to do that by continuing to increase the diversity of participants, embracing the rapid adoption of new learning-based analytical tools, and ensuring their design and use improves care for all people. She expressed her commitment to leveraging commonalities across all research areas—from biology to barriers in accessing care—to strengthen collaboration across the 27 NIH institutes and centers.

“As a physician-scientist for more than 30 years, I have seen the transformative power of NIH research to produce results

that save lives, including my own treatment for breast cancer,” said Bertagnolli. “As NIH director, I look forward to ensuring that NIH continues to be the steward of our nation’s medical research while engaging all people and communities in the research effort that includes informing medical practice that drives equitable access to health care for all.”

## About Bertagnolli

Bertagnolli has been a cancer surgeon for more than 35 years. Before joining NCI, she specialized in treating and researching gastrointestinal cancers in her roles as the Richard E. Wilson Professor of Surgery at Harvard Medical School, a surgeon at Brigham and Women’s Hospital, and a member of the Gastrointestinal Cancer Treatment and Sarcoma Centers at Dana-Farber Cancer Institute, all in Boston.

Bertagnolli graduated from Princeton University (Princeton, New Jersey) with a bachelor’s degree in engineering and went on to receive a Doctor of Medicine degree from the University of Utah in Salt Lake City. She trained in surgery at Brigham and Women’s Hospital and was a research fellow in tumor immunology at the Dana-Farber Cancer Institute. ●

Portions of this article are adapted from a Nov. 9 NIH press release available at <https://www.nih.gov/news-events/news-releases>.

## NINDS's New Scientific Director: Jeffrey Diamond, Ph.D.

An Eye for Talent: Diamond will Foster Inclusivity, Mentorship

BY JOHN CARLO JADORMEO COMBISTA, NIMH



CREDIT: NINDS

Jeffrey Diamond became the new NINDS scientific director in August, 2023.

**JEFFREY DIAMOND WAS NAMED** scientific director (SD) of NINDS after serving for one year as acting SD. He leads a program of approximately 50 PIs and hundreds of trainees and support staff, succeeding both **Lorna Role**, who was NINDS SD from 2019 to 2021, and **Nina Schor**, who served as an interim SD while deputy director of NINDS.

Diamond said he is excited to embark on the long-term planning necessary to steer the future direction of NINDS research and advance its mission. He is planning an inclusive approach to identify the research strengths of the NINDS community and will talk and listen to people about strategies that would complement those strengths, rather than imposing a specific scientific direction on the institute.

“My vision focuses on the quality of the environment, the science that we are doing, and the interactions and collaborations within the community,” Diamond said. “It is certainly humbling to have a leadership role in a community with so many world-class scientists. I am honored and excited because with the advancements of technology, there has probably never been a more exciting time

to study neuroscience.”

Diamond is best known for his research on understanding how neural circuits receive, compute, encode, and transmit information using the retina as a model system. His lab continues to examine how synapses and neurons within retinal circuits perform specific visual computations.

Colleagues across the NIH celebrate Diamond’s appointment. “Jeff is more than just a great scientist of the retina and synapses,” said **Wei Li**, senior investigator of the NEI’s Retinal Neurophysiology Section. “Trained as an engineer, he approaches the complexities of the retina with precision that is as admirable as it is effective. His warmth and consideration for others consistently shine through, and he is a creative leader marked by fairness and a strong sense of connection.”

Diamond joined NINDS as an investigator in 1999. Since then, he received the Presidential Early Career Award in Science and Engineering (PECASE) in 2000 and was promoted to senior investigator in 2007.

The Synaptic Physiology Section, which Diamond leads, explores the biophysical properties of retinal synapses and how they compute visual contrast (*Nat Neurosci* 14:1555–1561, 2011). His laboratory was among the first to perform synaptic analysis at analogous retinal synapses (*Nat Neurosci* 7:826–833, 2004). A paper published with his graduate student, Andrés Chávez, described the synaptic mechanism behind feedback inhibition at reciprocal synapses between A17 amacrine cells and rod bipolar cells (*Nature* 443:705–708, 2006). Diamond’s own doctoral research left open big questions about how NMDA receptors in the brain work to enhance visual signaling, and 25 years later he published work that provided potential answers

(*Neuron* 89:1277–1290, 2016).

Diamond credits his mentors and mentees, who have influenced the scientist and leader that he has become today. His former professor, Gerald Westheimer at the University of California at Berkeley, introduced him to the field of neuroscience through a lecture about the retina. And he expressed gratitude for David Copenhagen at the University of California at San Francisco for guiding his doctoral training, as well as Craig Jahr at the Vollum Institute (Portland, Oregon) for his postdoctoral training.

Of importance to Diamond is having mentors who are both older and younger than oneself, as well as those within and outside the field of science, to learn different perspectives.

“I have always benefited from the perspective and advice of my mentors, who are older and younger than me, especially as neuroscience becomes so incredibly diverse and technically sophisticated. It becomes difficult to stay on top of everything,” he said, adding, “the scientific enterprise would not continue without good mentoring.”

Outside of work, Diamond has learned how to make furniture, is fond of skiing, and has been playing golf since the pandemic. ●

*John Carlo Jadormeo Combista is a predoctoral fellow in the NIMH Oligodendroglial Interactions Group under the supervision of Tobias Merson. He is interested in understanding how the brain develops and functions by exploring how patterns of myelination within specific neural circuits emerge. Outside of academia and writing, he is passionate about singing and volunteers his free time to work with vulnerable populations, such as children.*

## Eat Less, Age Better

### Modest Calorie Restriction May Benefit Human Health

BY STEPHEN ANDREWS, NCI



CREDIT: NIA

Luigi Ferrucci

**SIT DOWN FOR A MEAL WITH AN** Okinawan elder and you might be told to mind your *hara hachi bu*, a Confucian-inspired Japanese concept to practice mindful eating and stop when you feel 80% full. With a reputation for longevity of life, the Okinawans might be on to something.

Beyond extending lifespan, reducing food intake might also improve health span—the length of time a person is relatively healthy.

“Our research indicates that moderate calorie restriction in humans has the potential to influence various biological pathways [that], when activated, may positively contribute to healthy aging and resilience of muscle tissue,” said NIA’s **Jayanta Kumar Das**. Das is first author

of a recently published paper (*Aging Cell* 12:e13963, 2023) that suggests calorie restriction (CR) can have positive, not negative, effects on sustaining skeletal muscle. This research builds on years of discovery.

### Laying a foundation of clinical research

CR means reducing average daily caloric intake below what is typical or habitual, without malnutrition or deprivation of essential nutrients. Restricting energy intake seems to be having a moment in popular culture, too, with fads such as intermittent fasting en vogue.

But if energy affects almost all processes within an organism, from sleep to movement to aging, what could be happening physiologically for, in effect, eating less to be beneficial for longevity? Some of the first investigations into calorie restriction were conducted in mice and nonhuman primates. Those studies showed positive broad effects of CR on the longevity and long-term health of the animals.

Next came testing those findings in humans. In the early 2000s, Eric Ravussin at the Pennington Biomedical Research Center (Baton Rouge, Louisiana) assembled a meeting of the leading investigators on CR to initiate design of a clinical trial to

test how calorie restriction over two years would affect several biological processes. Investigators in aging research, including NIA’s **Rafael de Cabo** participated and supported the initiation of this multisite Comprehensive Assessment of the Long-term Effects of Reducing Intake of Energy (CALERIE) Study, which was supported with funds from NIA and NIDDK.

An ambitious goal was set for participants to restrict their typical caloric intake by 25%. In the end, they achieved a 12% reduction in calorie intake with support and monitoring from an interdisciplinary research team. But the results were still positive. According to de Cabo, participants that restricted calories by even 12% had improved mental health, a healthier sleep core temperature, and lost trunk fat, compared with control subjects who continued regular calorie intake (*J Gerontol A Biol Sci Med Sci* 70:1097–1104, 2015).

### Built to last

Rigorous study design was integral to ensure that the data could be used many years after the initial trial concluded. In 2010, 225 diverse individuals were recruited between 21 and 50 years of age for men and, for women, 21 and 47, which avoided the metabolic effects of menopause confounding results. The participants had to have a body

### CATALYTIC EVENTS

A smattering of catalytic events happening around NIH in January and February.



#### JANUARY

**1/16** Demystifying Medicine 2024 Series: Emerging and Re-emerging Infectious Diseases: An Update, Anthony Fauci and Atul Gawande, 4 p.m., VideoCast

**1/17** NIH Director’s Lecture: Reducing Firearm Violence: A Public Health Approach, David Hemenway, 2 p.m., Lipsett Amphitheater and VideoCast

**1/18** NIH Industry Day, multiple speakers, scientific conference will focus on six subject areas, 8:15 a.m. to 5 p.m., virtual only, registration required

**1/31** Wednesday Afternoon Lecture Series (WALS): Leveraging genetics and cell signaling to decipher disorders of excitability, Richard Tsien, 2 p.m., Lipsett Amphitheater and VideoCast

#### FEBRUARY

**2/7** WALS: Prioritizing Genetics to Reduce Existing Health Disparities, Nancy J. Cox, 2 p.m., Lipsett Amphitheater and VideoCast

**2/13** Demystifying Medicine 2024 Series: Hepatitis D and E: New Challenges and Progress, Theo Heller and Marc Ghany, 4 p.m., Lipsett Amphitheater and VideoCast

**2/21** WALS: Tale of Two Cities: Disease Based Research or Geroscience?, Laura Niedernhofer 2 p.m., Lipsett Amphitheater and VideoCast

**2/28** Dyer Lecture: Influenza Pathogenesis and Therapeutics in Vulnerable Populations, Stacey Shultz-Cherry, 2 p.m., Lipsett Amphitheater and VideoCast

mass index between 22.0 and 28.0. They also were screened for other exclusion criteria that would confound results, such as engaging in frequent strenuous exercise.

### Aging stronger

After those promising initial findings, NIA Scientific Director Luigi Ferrucci became involved. Research conducted at the Pennington Biomedical Research Center had found that the modest caloric restriction also lowered cardiometabolic risk and lowered weight along with muscle mass but did not lower muscle strength. Ferrucci found this intriguing considering that the participants were of healthy weight when the study began. “We thought to hunt for mechanisms behind this muscle strength phenomenon,” he said.

For that study, the researchers procured thigh muscle biopsies from CALERIE participants collected when individuals joined the study and at one-year and two-year follow ups. To figure out which genes CR was affecting, they recovered messenger RNA from the samples and ran a gene-expression analysis.

Small changes in the muscle gene-expression profile were uncovered using deep genomic sequencing, which included alternative splicing. This process occurs when rearrangements of the exons (coding sections of an RNA transcript) lead to changes in the final protein. The study authors, including de Cabo and Ferrucci, believe that this is where CR is mediating its effect in muscle tissue and may significantly affect muscle tone and function over the long term.

Effectively augmented by CR, the muscles were generating more force per unit of mass. The scientists found upregulated genes implicated in mitochondrial biosynthesis, which effects energy production, as well as DNA repair and antioxidant mechanisms, which fight inflammation.

Muscle is one of the most metabolically active organs in the body, and as such, the

cells accrue outsized damage and oxidative stress over time. The newly associated pathways through which CR works could potentially combat that damage and preserve the longevity and function of muscle cells as we age.

### Is it for everyone?

Decades of research show that obesity accelerates aging and that reducing caloric intake for individuals who are above average weight results in significant health benefits including a decreased risk of multiple comorbidities and chronic inflammation. The American Heart Association, American College of Cardiology, and the Obesity Society now recommend prescribing CR in addition to other interventions.

In the CALERIE study, however, researchers focused on individuals with healthy weights. So, does this research warrant the same recommendations for these healthy individuals?

“At this time, we don’t have enough evidence to put out a public statement—we can’t guarantee anything,” said Ferrucci, adding that even with the intriguing results in muscle and other tissues, it was clear that not every individual responds the same way to CR. This inconsistent response is partially due to metabolic adaptation, timing of meals, and other lifestyle and environmental factors that cannot be controlled. ●

*Stephen Andrews is a postbaccalaureate research fellow at NCI who is studying molecular genetics and tumor modeling related to neuroendocrine tumors of the small intestine and pancreas. Outside of the laboratory, he enjoys running, cycling, cooking, and visiting art galleries.*

Read a longer version of this article online at <https://irp.nih.gov/catalyst/32/1>.

To learn more about the CALERIE Study, visit <https://calerie.duke.edu/>.

### NIH ABBREVIATIONS

- CBER:** Center for Biologics Evaluation and Research, FDA
- CC:** NIH Clinical Center
- CCR:** Center for Cancer Research, NCI
- CIT:** Center for Information Technology
- DCEG:** Division of Cancer Epidemiology and Genetics, NCI
- DIPHR:** Division of Intramural Population Health Research, NICHD
- FAES:** Foundation for Advanced Education in the Sciences
- FARE:** Fellows Award for Research Excellence
- FelCom:** Fellows Committee
- FDA:** Food and Drug Administration
- FNII:** Foundation for the NIH
- FNL:** Frederick National Laboratory
- IRP:** Intramural Research Program
- HHS:** U.S. Department of Health and Human Services
- NCATS:** National Center for Advancing Translational Sciences
- NCBI:** National Center for Biotechnology Information
- NCCIH:** National Center for Complementary and Integrative Health
- NCI:** National Cancer Institute
- NEI:** National Eye Institute
- NHGRI:** National Human Genome Research Institute
- NHLBI:** National Heart, Lung, and Blood Institute
- NIA:** National Institute on Aging
- NIAAA:** National Institute on Alcohol Abuse and Alcoholism
- NIAD:** National Institute of Allergy and Infectious Diseases
- NIAMS:** National Institute of Arthritis and Musculoskeletal and Skin Diseases
- NIBIB:** National Institute of Biomedical Imaging and Bioengineering
- NICHD:** Eunice Kennedy Shriver National Institute of Child Health and Human Development
- NIDA:** National Institute on Drug Abuse
- NIDCD:** National Institute on Deafness and Other Communication Disorders
- NIDCR:** National Institute of Dental and Craniofacial Research
- NIDDK:** National Institute of Diabetes and Digestive and Kidney Diseases
- NIEHS:** National Institute of Environmental Health Sciences
- NIGMS:** National Institute of General Medical Sciences
- NIMH:** National Institute of Mental Health
- NIMHD:** National Institute on Minority Health and Health Disparities
- NINDS:** National Institute of Neurological Disorders and Stroke
- NINR:** National Institute of Nursing Research
- NLM:** National Library of Medicine
- OD:** Office of the Director
- OITE:** Office of Intramural Training and Education
- OIR:** Office of Intramural Research
- ORS:** Office of Research Services
- ORWH:** Office of Research on Women’s Health
- OTT:** Office of Technology Transfer

## Recently Tenured



DANIEL CHERTOW, NIAID



BRIAN GLANCY, NHLBI



MARIO PENZO, NIMH



ADAM SOWALSKY, NCI-CCR



MICHAEL WARD, NINDS

### DANIEL S. CHERTOW, M.D., CC, NIAID

*Senior Investigator and Head, Emerging Pathogens Section, Critical Care Medicine Department, NIH CC and NIAID Laboratory of Virology*

**Education:** Boston College, Newton, Massachusetts (B.A. in sociology); University of California at Berkeley (M.P.H.); Northwestern University Feinberg School of Medicine, Chicago (M.D.)

**Training:** Internal medicine internship and residency, University of California at San Diego (2000–2003); epidemic intelligence service officer, United States Centers for Disease Control and Prevention, Atlanta (2004–2006); critical care medicine fellow, NIH Clinical Center (2007–2008); infectious diseases fellow, Johns Hopkins University, Baltimore (2008–2010)

**Came to NIH:** In 2007 as a critical care medicine fellow, NIH CC

**Outside interests:** Swimming; surfing

**Website:** <https://irp.nih.gov/pi/daniel-chertow>

**Research interests:** My research group focuses on gleaning mechanistic insights into the pathogenesis of critical illness due to severe emerging or re-emerging infectious diseases including Ebola virus disease and COVID-19. To accomplish our research aims we use human natural history studies during life and postmortem, in vitro mechanistic studies, and advanced

animal models. In a recent autopsy study of 44 fatal COVID-19 cases, we determined that severe acute respiratory syndrome coronavirus (SARS-CoV-2) infects cells and tissues throughout the body, including the brain, and that SARS-CoV-2 RNA and protein may persist in tissues for months (*Nature* 612:758–763, 2022).

### BRIAN GLANCY, PH.D., NHLBI

*Senior Investigator, Muscle Energetics Laboratory, NHLBI; secondary appointment at NIAMS*

**Education:** University of the Pacific, Stockton, California (B.A. in sports science); Arizona State University, Tempe, Arizona (M.S. in kinesiology, Ph.D. in exercise science)

**Training:** Postdoctoral fellow, NHLBI (2009–2016)

**Came to NIH:** In 2009 as a postdoctoral fellow, NHLBI

**Outside interests:** Playing football; sports; good food

**Website:** <https://irp.nih.gov/pi/brian-glancy>

**Research interests:** Skeletal muscle is the most abundant tissue in humans and faces near-instantaneous changes in demand for force production lasting from seconds to minutes to hours. Initiating and maintaining muscle contraction requires

rapid, coordinated movement of signals and material within and among various structures located throughout the relatively large muscle cell. The Muscle Energetics Laboratory focuses on the energy-distribution aspect of continued muscle contraction, deficits in which have been implicated in many pathologies including diabetes and muscular dystrophy as well as aging. In particular, we aim to determine how mitochondria are optimized as part of the integrated muscle cell to maintain energy homeostasis during the large change in energy demand caused by the onset of muscle contraction. We recently identified several genes that determine where mitochondria are placed within fly skeletal muscles (*Nat Commun* 13:661, 2022) as well as how the location of mitochondria determines the structure of the adjacent contractile machinery within striated muscle cells of flies, mice, and humans (*Nat Commun* 13:6058, 2022).

### MARIO PENZO, PH.D., NIMH

*Section Chief, Neural Circuits of Emotion and Motivation, NIMH*

**Education:** University of Puerto Rico at San Juan (B.S. in biology); Albert Einstein College of Medicine, New York (Ph.D. in neuroscience)

**Training:** Postdoctoral fellow, Cold Spring Harbor Laboratory, Laurel Hollow, New York (2011–2015)

**Came to NIH:** In 2015 as an investigator, NIMH

**Outside interests:** Church; sports; music; wine

**Website:** <https://irp.nih.gov/pi/mario-penzo>

**Research interests:** Our mission is to identify the molecular, cellular, and neural circuit mechanisms underlying emotional and motivated behaviors. To fulfill this mission, our laboratory implements a multidisciplinary approach that includes behavioral assays as well as cutting-edge technologies for monitoring and manipulating the activity of defined neuronal populations in mice.

Current research efforts are centered on investigating the contributions of the dorsal midline thalamus to aversive and reward-seeking behaviors (*Nat Neurosci* 24:1429–1440, 2021). For this, we use in vivo calcium-imaging techniques in conjunction with optogenetic and chemogenetic approaches while animals perform appetitive and defensive behavioral tasks. In addition, our laboratory uses patch-clamp electrophysiology in acute brain slices, along with pharmacological and genetic tools to investigate the cellular and molecular mechanisms that underlie behavior (*Nat Neurosci* 23:217–228, 2020).

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**ADAM G. SOWALSKY, PH.D., NCI**

*Senior Investigator and head of the Prostate Cancer Genetics Section, Genitourinary Malignancies Branch, NCI Center for Cancer Research*

**Education:** The University of Texas at Austin (B.S. in cell and molecular biology); Tufts University Graduate School of Biomedical Sciences, Boston (Ph.D. in biochemistry)

**Training:** Postdoctoral training in molecular pathology and bioinformatics, Harvard

Medical School and Beth Israel Deaconess Medical Center, Boston (2010–2014)

**Came to NIH:** In 2015 as an investigator in the Laboratory of Genitourinary Cancer Pathogenesis, NCI

**Outside interests:** Teaching my young children to cook; swimming; attending Major League Baseball games

**Website:** <https://irp.nih.gov/pi/adam-sowalsky>

**Research interests:** I lead a translational research program focused on understanding the contributions of prostate cancer evolution toward therapy resistance and treatment response. Using patient samples from NCI clinical trials, we combine bench-based methods with cutting-edge computational approaches to assess tumor-based biomarkers and mechanism of progression in patients with locally advanced prostate cancer, with a goal [of identifying] novel targets that can be tested therapeutically (*Cancer Res* 78:4716–4730, 2018). Intratumoral heterogeneity in prostate cancer is a well-acknowledged property of the disease, but our group was the first to demonstrate therapeutic consequences for this heterogeneity in individual patients (*Nat Commun* 11:837, 2020; *JCO Precis Oncol* 5:1514–1522, 2021).

We have further identified prostate cancer biomarkers for identifying residual disease after intense hormonal therapy (*J Urol* 208:90–99, 2022) and observed direct correlations between the ability of tumors to resist therapy and their evolutionary trajectories (*Eur Urol* 80:746–757, 2021). In the longer term, we are working with physician colleagues to translate the targets and biomarkers we have identified into new clinical trials.

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**MICHAEL WARD, M.D., PH.D., NINDS**

*Senior Investigator, Neurogenetics Branch, NINDS*

**Education:** Kenyon College, Gambier, Ohio (B.S. in biology); Washington University in St. Louis (M.D., Ph.D., in molecular biology)

**Training:** Neurology resident, University of California at San Francisco (2008–2011); postdoctoral fellow, Gladstone Institutes, San Francisco (2011–2013)

**Came to NIH:** In 2015 as an assistant clinical investigator, NINDS

**Outside interests:** Snowboarding; hiking; playing guitar

**Website:** <https://irp.nih.gov/pi/michael-e-ward>

**Research interests:** Our research focuses on cellular and molecular mechanisms of frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS), two related neurodegenerative disorders. We use a combination of cell biology and proteomic and functional genomic approaches in induced pluripotent stem cells (iPSC) neuron models of ALS and FTD, with a long-term goal of understanding how disease-associated familial mutations lead to neurodegeneration. Our group has made several major contributions to the field over the past several years: 1) Discovery of a new mechanism of axonal RNA transport in neurons that involves lysosomal hitchhiking, a process that goes awry in familial ALS (*Cell* 179:147–164, 2019); 2) characterization of dysregulated splicing in ALS and FTD due to mislocalization of TDP-43, uncovering novel disease-relevant splicing targets and potential biomarkers (*Nature* 603:131–137, 2022); 3) discovery of widespread DNA break and repair events at neuronal enhancers that are likely necessary for epigenetic regulation (*Nature* 593:440–444, 2021); 4) new tools that enable large-scale production of human iPSC-derived neurons and genome-wide CRISPR/Cas9 gene-editing method interference screens, as well as co-conception and management of a large-scale genome-engineering iPSC initiative with NIA's Mark Cookson (*Neuron* 109:1080–1083, 2021). ●



# The History of NIH in (About) 12 Objects: A Curator's Chronicle

## Lyons Retires, Leaves Historic Legacy

IT ALL STARTED WITH A BOTTLE OF whiskey. Many a morning-after tales begin with such a line, but now we know that line also covers the inception of the National Institutes of Health (NIH), according to Michele Lyons, associate director and curator at the Office of NIH History and Stetten Museum.

Lyons shared, how shall we put it, our ol' salty origins and other insightful bits of NIH history during her Dec. 11 talk, "The History of NIH in (About) 12 Objects: A Curator's Chronicle."

"Objects tell stories—why something was made, when it was made, how it was made, what it was made for, who made it, who invented it, who used it, what they used it for, and what the end result was of their work," Lyons explained about the objects she showcased. "Sometimes, the stories that the objects in our collection tell are pretty technical scientific and medical discoveries, but they always have a human element as well, because fundamentally, NIH's history is the story of how people have worked together toward one end."

Here are the highlights on (about) 12 objects.



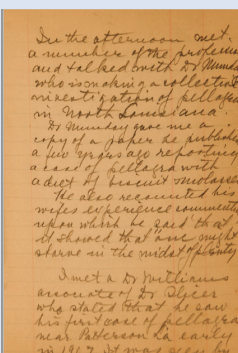
### 1. GREEN RIVER WHISKEY WATCH FOB, C. 1908

Green River Whiskey was used onboard U.S. Marine Hospital

Service ships from about 1895 as a "medicinal" and kept by the captain under lock and key. "Green River Whiskey was the official whiskey of the United States Marine Hospital Service and the precursor of the establishment of NIH with a Hygienic Laboratory, and really, it describes the state

of medicine at that time," Lyons told the *Catalyst*. Green River Whiskey was used on the ship to treat every ailment suffered by the sailors.

### 2. DIARY OF JOSEPH GOLDBERGER, 1915



Joseph Goldberger conducted a major epidemiological investigation in the American South while studying the cause of pellagra, and discovered its cause was a vitamin B

deficiency. His diary is emblematic of the new fields of research pioneered by hygienic laboratory researchers in the early 20th century including air pollution, allergies, and parasitic and infectious diseases—often experimenting on themselves.

### 3. H. TRENDLEY DEAN DENTAL COLLECTION



Used by H. Trendley Dean, the first NIH dental scientist. Dean became the first director of the National Institute of Dental Research, now NIDCR, in

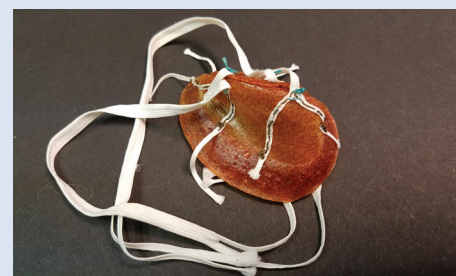
1948, the same year to which five other NIH institutes can trace their establishment and in which the National Institutes of Health became plural.

### 4. NIH MULTI-PLATER, 1963



This multiple Millipore filtration instrument, or multi-plater, was invented at NIH by Philip Leder and Charles Byrne, and used by two NIH Nobel laureates, Marshall Nirenberg and Martin Rodbell. Nirenberg was honored for deciphering the genetic code, and Rodbell for discovering signal transduction in cells. Genetics and cell biology would never be the same.

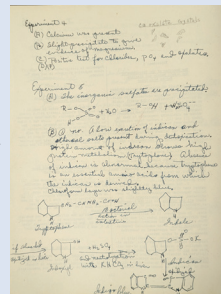
### 5. BRAUNWALD-MORROW MITRAL HEART VALVE, 1959



Designed by Nina Braunwald and Andrew Morrow at NIH, it was used in the first successful mitral valve replacement in a human on March 11, 1960. The little valve invokes NHLBI's fruitful cardiology program as well as how clinician researchers at the NIH Clinical Center help to set national standards.

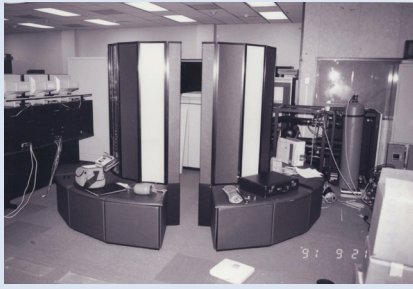
### 6. LAB MANUAL OF BIOLOGICAL CHEMISTRY, 1950

This textbook belonged to Glendowlyn Young-Cooper, a Black woman who worked in the Laboratory of Immunology, NIAID. It's a symbol of the history of women, people of color, immigrants, and religious minorities at the NIH, and Lyons called for more such donations.





### 7. CRAY X-MP/22 SUPERCOMPUTER, 1985



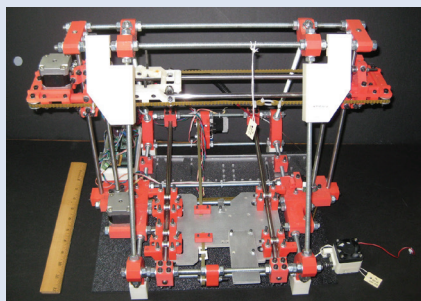
This computer was used between 1986–1992 at the NIH’s Laboratory of Mathematical Biology in NCI’s Advanced Scientific Computing Laboratory. It has the distinction of being the first supercomputer dedicated solely to biomedical research. There was no need for Lyons to stress the importance of computerization to biomedical research.

### 8. “WE’RE FIRED UP” ACT-UP PLACARD, 1990

Dropped by an AIDS activist at the largest AIDS demonstration on the NIH campus on May 21, 1990. The demonstration helped spur the inclusion of patients and their families on clinical research advisory boards, now a common policy.



### 9. 3D-PRINTER AND 3D-PRINTED PROSTATE MOLD, 2008

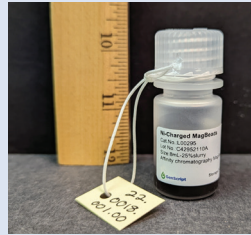


This 3D printer was built by Marcelino Bernardo as part of his work on matching prostate cancers to MRI information in 3D printed molds.



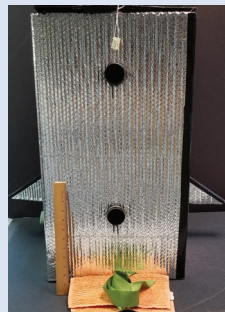
### 10. GENSCRIPT NI-CHARGED MAGBEADS

Lyons showed a selection of objects related to the COVID-19 pandemic, which she called “NIH’s finest hour.” These magnetic beads were used in NCI’s Protein Expression Laboratory to purify large quantities of SARS-CoV-2 proteins for research.



### 11. AEROSOL CHAMBER, 2020

Adriaan Bax’s NIDDK laboratory began studies on the aerosol transmission of SARS-CoV-2 very early in the pandemic. They built their own experimental chambers, like this one from a recycling bin, which became more elaborate as their experiments continued.



### 12. BARNEY GRAHAM BOBBLEHEAD, 2022

Before Barney Graham retired from the NIAID Vaccine Research Center in 2021, he played a pivotal role in the development of mRNA vaccines, in particular for COVID-19 and Zika. During the pandemic, NIH staff were depicted in popular culture in many ways.



### +1. YOU, TODAY

Lyons wants every NIH employee to understand that we each are making history every day. She described the “Power of One.”



“The power of one person, one problem, one disease, one outbreak, or one condition can spur new knowledge and whole new fields of research; and the power of one legislative act, like the one in 1947 that established the NIH Clinical Center,” she said.

“I want people to give the NIH History Office and Stetten Museum the instruments and devices they are using now,” she continued. “People don’t think about themselves as ‘history’ but even if you are not inventing an instrument and are just using something that is common, that’s important, too.” Lyons said the museum has a lengthy wish list, so feel free to reach out and see if you can check any items off their list.

Lyons retired with the close of the 2023 calendar year. In her final remarks at the lecture, she thanked those who have donated items to the History Office over the years.

“Thank you for saving our nation’s legacy, for thinking ahead about what future people will want or need to know, and for just loving history,” she said.

The same could be said of her. ●

Visit <https://videocast.nih.gov/watch=53816> to watch the presentation...and learn 12 things about Lyons, too.

“The power of one person, one problem, one disease, one outbreak, or one condition can spur new knowledge and whole new fields of research,” — Michele Lyons

## PAYING TRIBUTE

*Each year, the January–February issue of The NIH Catalyst pays tribute to NIH employees past and present who are no longer with us. Our condolences are with their friends, family, and colleagues who knew and loved them.*

**Mary Anne Bright**, 67 (died April 16), came to the NIH CC in 1986 as an oncology nurse specialist before eventually becoming NCI's Cancer Information Service director until her retirement in 2018.

**Bill Bunnag**, 84 (died Nov. 5), came to NCI in 1974 as a cytotechnologist and became chief of the Cytology Automation Section before joining the Office of Technology Development as a health scientist administrator in 1988. He then served as a scientific review officer and as a referral officer at the Center for Scientific Review. Bunnag promoted Asian American, Native Hawaiian, and Pacific Islander efforts across NIH.

**Enrico Cabib**, 98 (died Feb. 24), joined NIDDK in 1967 as a principal investigator and was known for his expertise in the biochemistry and genetics of the yeast cell wall. He retired in 2012 as senior investigator in the morphogenesis section of the Laboratory of Biochemistry and Genetics.

**Amoz Chernoff**, 100 (died March 25), came to NIH in 1978 and served as director of the Division of Blood Diseases and Resources at NHLBI and was a scientific advisor to the American Association of Blood Banks. His research included sickle-cell disease and the discovery of a new hemoglobin found in thalassemia patients. He also advocated blood bank and transfusion safety.

**William “Bill” Dehn**, 86 (died Aug. 18), retired in 2003 after more than 40 years at NIH as the last glassblower in the Office of Research Services Biomedical Engineering and Instrumentation Branch, where he produced devices created to individual specifications and research protocol requirements.

**John J. DiGiovanna**, 73 (died Feb. 6), came to the NCI Dermatology Branch in 1980 to develop treatments for dermatologic disorders and skin cancer chemoprevention. In 1994, he led the NIAMS Dermatology Clinical Research Unit; in 2000, he joined the NCI-CCR's Basic Research Laboratory; and from 2010 on, he served in the DNA Repair Section of the Laboratory of Cancer Biology and Genetics.

**Ronald Dubner**, 88 (died Jan. 22), came to NIDCR (then NIDR) in 1959 as an intern before becoming a research scientist, section chief, and then lab chief with the Neurobiology and Anesthesiology Branch before leaving NIH in 1995.

**Gerhard Ehrenspeck**, 81 (died Jan. 3), came to NIH in 1988 as a scientific review officer. He managed the Center for Scientific Review's cellular biology and physiology study section before retiring in 2006.

**Marguerite M. Engler**, 67 (died March 9), completed her doctoral research training at NHLBI and NIAAAA. She joined NINR in 2011 and served as acting scientific director, deputy scientific director, and senior clinician and chief of the Cardiovascular Symptoms Unit. Her work focused on nutritional interventions to stem the tide of cardiovascular disease, and she defined many biomarkers of vascular health, endothelial function, and vascular aging.

**Lawrence Faucette**, 58 (died Oct. 30), worked at NIAID as a histology technician from 2003 to 2008. Faucette received the world's second genetically modified pig heart transplant and lived for nearly six weeks following the surgery.

**Delilah Stokes Foster**, 93 (died Aug. 12), came to the NIH CC's Chemistry Laboratory in 1959, where she worked as a medical technologist. After a long hiatus to raise her children, Foster returned to the Chemistry Laboratory for over 10 years before retiring in 1995.

**Harold Gainer**, 88 (died Nov. 7), joined

NICHHD in 1969 as a research physiologist and later became chief of the Laboratory of Neurochemistry and Immunology. In 1987, he became chief of the NINDS Laboratory of Neurochemistry, served as acting scientific director from 1994 to 1995, and served as Basic Neuroscience director from 1990 to 2000 before retiring in 2012.

**Sanford “Sandy” Garfield**, 80 (died Oct. 30), came to NIH in 1987 and worked for 25 years at NIDDK. While there, he oversaw landmark studies including the Diabetes Prevention Program, which focused on improving the treatment and prevention of type 2 diabetes in high-risk groups.

**Herb Geller**, 78 (died April 16), came to NHLBI in 2001 and served as chief of the Developmental Neurobiology Laboratory in the Cell and Developmental Biology Center, and as director of the Office of Education from 2001 to 2019. He was known in the neuroscience field for his research into how extracellular signals could improve recovery of function after brain injury.

**Andy Golden**, 63 (died July 1), came to NCI in 1994 as a program fellow. He later joined NIDDK in 2000 and became chief of the Genetics of Early Development Section in the Laboratory of Biochemistry and Genetics. Golden used worm genetics to understand the mechanisms underlying the beginning of human life and studied worms to learn more about the genetic disorders underlying cardiac arrhythmias.

**Enoch Gordis**, 92 (died April 5), served as NIAAAA director from 1986 to 2001 and was an internationally known expert on alcoholism and addiction.

**S. Perwez Hussain**, 63 (died Nov. 24), joined NCI in 1994. For over 25 years, Hussain's translational research was integrated into clinical trials for patients with pancreatic cancer, and he established the pancreatic cancer research program in the Laboratory of Human Carcinogenesis.

**Yoichiro Ito**, 94 (died Oct. 28), came to NHLBI in 1968 as a visiting scientist, where he joined the Laboratory of Technical Development. In 1978, he became an NIH Medical Officer and founded the Laboratory of Bioseparation Technology before retiring in 2022. Ito was known in the field of chromatography for inventing devices based on seal-free solvent flow and applying it to separate blood components.

**Barry Kaplan**, 76 (died April 15), joined NIMH in 1997 and was the inaugural director of the Office of Fellowship Training, the first training office on the NIH campus. He was known for his dedication to mentoring young scientists. Kaplan also served as chief of the Section on Molecular Neurobiology from 1998 to 2018.

**Rebecca Kolberg**, 64 (died Feb. 10), served as managing editor of *The NIH Catalyst* from 1994 to 1996, before joining NHGRI in 2002, and later becoming chief of the NIH Director's Presentations Branch in the NIH Office of Communications and Public Liaison. Kolberg retired in December 2022.

**W. Michael Kuehl**, 83 (died April 24), completed his postdoctoral training at NHLBI before joining NIH in 1982 as a senior investigator in the NCI-Navy Medical Oncology Branch. He later joined the Genetics Department of the NCI Medicine Branch (now the Genetics Branch), where he served as deputy chief (2001–2006) before retiring in 2015.

**Claude Lenfant**, 94 (died June 26), came to NIH in 1972 to develop the NHLBI Division of Lung Diseases and became the longest serving director of the Institute, leading it for 21 years until retiring in 2003. He was known for leading landmark initiatives such as the Programs of Excellence in Molecular Biology, the Proteomics Initiative, and NIH's first gene-therapy protocol.

**Gerald Liddel**, 85 (died Jan. 14), was a microbiologist who came to NCI in 1977 as a referral officer in the Grants Review Branch. He moved to the Division of Research Grants (now the Center for Scientific Review) in 1981

as a scientific review administrator of microbial genetics. In 1986, Liddel became a referral officer for applications in microbiology before retiring in 1999.

**Mark Louder**, 58 (died March 24), came to NIH in 2001 as a founding member of the Vaccine Research Center (VRC) and served as a lab manager and researcher at the Humoral Immunology Core. Throughout his career, Louder contributed to the VRC's work in disease areas including HIV and COVID-19.

**Ying Ma**, 59 (died Nov. 20), came to NIH in 1993 as a visiting scholar and in 1999 joined the Positron Emission Tomography Department at the Clinical Center. Ma was an expert in mass-spectrometry techniques, and in 2004, his group moved to NIBIB as one of its first intramural components.

**Henri Alice Lowery**, 86 (died April 17), was a clinical psychologist at NIMH who was known for her work on the treatment and rehabilitation of people with severe mental disorders. Lowery directed the NIMH program on the treatment and rehabilitation of people with schizophrenia, administered the Treatment of Depression Collaborative Research Program, and served as a consultant to the World Health Organization before retiring in 1992.

**Allan Mirsky**, 94 (died Feb. 3), worked at NIMH from 1954 to 1962, then returned two decades later as chief of the NIMH Laboratory of Psychology and Psychopathology. He contributed to the field of neuropsychology and to understanding schizophrenia and epilepsy in particular.

**Herbert "Sandy" Carpenter Morse III**, 80 (died Sept. 11), came to NIAID in 1972, where he worked for over 45 years and served as chief of the Laboratory of Immunopathology. Morse's research focused on retrovirology, immunogenetics, autoimmunity, and animal models of disease.

**Abner Notkins**, 90 (died March 10), came to NIH in 1960 as a research associate at NCI before serving as NIDCR (then NIDR) scientific director from 1985 to 1992. He was an expert on viral immunology and throughout

his 60-year career at NIH became one of the architects of the modern NIH Intramural Research Program. Notkins suggested and organized NIH's first Research Day in 1986, an annual tradition that lives on today as the NIH Research Festival.

**Editha Nottelmann**, 87 (died April 9), was a psychologist who served as chief of the Affective and Regulatory Disorders Branch in the Division of Developmental Translational Research at NIMH before retiring in 2008 after 28 years at NIH. Nottelmann provided leadership in developing the NIMH research portfolio on bipolar disorder in children and adolescents and was known for her mentorship of others.

**James M. Phang**, 84 (died Jan. 29), was a senior investigator in the NCI-CCR Basic Research Laboratory. He worked at NCI for nearly 50 years before retiring in 2015. Phang's discoveries provided insight into tumor reprogramming and metabolic epigenetics and introduced novel strategies for cancer therapy.


**Keith Cranston Robbins**, 79 (died Aug. 11), came to NCI as a laboratory technician, in 1985 became chief of the Molecular Genetics and Cellular Development and Oncology Lab, and then served as chief of the NIDCR Molecular and Biology Section (1988–1996). Robbins researched the oncogene and the mechanisms of cancer causation.

**Christina Renee Savage**, 35 (died March 22), came to NIH in 2020 as a postdoctoral fellow at NCI-CCR. Savage's work focused on the cell biology of *Bacillus* and *Borrelia* bacteria.

**Elliott Schiffman**, 95 (died Dec. 31, 2022), was a biochemist who joined NHLBI (then NHI) in 1955 and moved to NIDCR (then NIDR) in 1962. From 1985 to 1990 he worked at NCI. While at NIH, Schiffman was known for his pioneering discoveries in cancer immunotherapy.

**Edmund C. Tramont**, 83 (died March 5), became director of the AIDS Division at NIAID in 2001. Tramont helped lay the groundwork for the NIH and United States Army collaboration in infectious disease prevention and vaccine development. ●

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## CATALYTIC REACTIONS?

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## PHOTOGRAPHIC MOMENT



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**ALL IN A DAY'S WORK: NEW NIH DIRECTOR MONICA BERTAGNOLLI ASSISTED NCI'S Stephanie Goff** in a tumor resection operation in OR 11 on Dec. 6, 2023. Goff's patient is enrolled in a clinical research trial (protocol number 000354-C). “These are the things that are absolutely thrilling for me and remind me why I am here,” Bertagnolli said. ●

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