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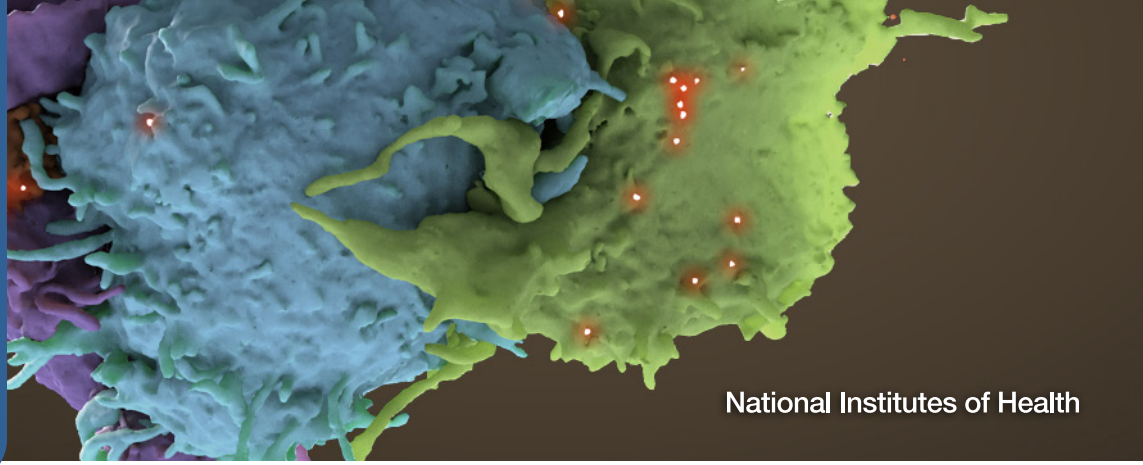


'A Fatal Inheritance' Author Discusses New Book

BY JENNIFER K. LOUKISSAS

Journalist Lawrence Ingrassia recently spoke at the National Cancer Institute (NCI) about his new book, which evolved from interviews with current and former researchers at NCI and several other institutions.

In 2019, Ingrassia, a former editor and reporter for the *Wall Street Journal, New York Times,* and *Los Angeles Times* contacted NCI to request interviews for a possible magazine article about Li-Fraumeni Syndrome (LFS), the syndrome which resulted in the deaths of his mother, three siblings and nephew. In March 2020, he came to the NCI to meet with Dr. Joseph Fraumeni, Jr.—founding director of NCI's Division of Cancer Epidemiology and Genetics (DCEG) and scientist emeritus—and DCEG staff.

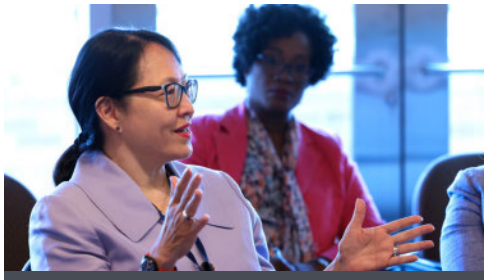
Journalist Lawrence Ingrassia (l) and Dr. Joseph Fraumeni recently visited NCI to discuss Ingrassia's medical mystery memoir.

PHOTO: NCI

The result of those initial and many subsequent discussions is the newly published memoir and medical mystery, *A Fatal Inheritance: How a Family Misfortune Revealed a Medical Mystery.*

LFS is an inherited disorder caused by deleterious variants in the TP53 tumor-suppressor gene with very elevated risk of several types of cancers. Investigators in DCEG have followed families with LFS since the syndrome was first described in 1969 by two epidemiologists in the intramural research program, the late Dr. Frederick Li and his collaborator, Fraumeni. Their seminal discovery was the foundation on which studies of genetic susceptibility to cancer were built.

SEE **INGRASSIA**, PAGE 4



Senate Mental Health Caucus staff visit. See p. 12

ALSO THIS ISSUE

TRANSPARENT MODELS

Zebrafish Help Scientists See How Hearing Works

BY ERIC BOCK

Dr. Katie Kindt

A small, striped fish that's found in pet stores across the country has become an important animal model for hearing and balance research, said Dr. Katie Kindt, during the recent National Institute on Deafness and Other Communication Disorders (NIDCD) "Beyond the Lab: Understanding Communication Disorders" speaker series lecture.

SEE **ZEBRAFISH**, PAGE 8

DIVRO RETURNS DIVIDENDS

NEI Diversity Program Shines a Light on Nelson

BY DUSTIN HAYS

NEI intern Luke Nelson

On the journey from Miami's Little Haiti to Howard University Medical School, Luke Nelson's summer internship at the National Eye Institute has been a pivotal steppingstone. Nelson's success is a feather in the cap of the initiative that helped get him there: the NEI Diversity in Vision Research and Ophthalmology (DIVRO) Program.

SEE **NELSON**, PAGE 6

NIH Research Festival Returns

The NIH Research Festival will take place Sept. 23 – 26.

The annual festival highlights the diversity of scientific disciplines within the NIH Intramural Research Program. It will feature an NIH information fair, workshops, lectures, poster sessions, NIH Green Labs Fair and biotech vendor information booths in and around Bldg. 10.

To view the agenda and other related information, see: https://researchfestival.nih.gov/2024

If you have questions related to this event, email researchfest@mail.nih.gov

A Research Fest poster session in 2023

PHOTO: MARLEEN VAN DEN NESTE

NIH Police Tour Children's Inn at NIH

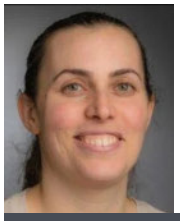
NIH police officers recently toured the Children's Inn at NIH, where they learned about the pivotal role Inn residents and families play in research at NIH. Afterward, the officers enjoyed coffee, donuts and cookies with some of the residents.

Sgt. Matt Mehlhaff (above) and NIH Police Chief Cleveland Spruill (below) visit with families at the Children's Inn.

Next Data Science Strategy Seminar Set

Sept. 13

NIH's Office of Data Science Strategy (ODSS) hosts a seminar series to highlight exemplars of data sharing and reuse on the second Friday of each month at noon ET. This monthly series highlights researchers who have taken existing data and found clever ways to reuse the data or generate new findings.



Dr. Danielle Braun (l) and Dr. Charles Schmitt

The next seminar will feature Drs. Charles Schmitt and Danielle Braun. On Sept. 13 at noon, they will present "Climate and Health Outcomes Research Data Systems (CHORDS)." The CHORDS project aims to support biomedical researchers in finding and using the data sets, tools and models needed to conduct environmental health research.

Schmitt is director of the office of data science, NIEHS, and a senior scientist in the NIEHS Division of Translational Toxicology. Braun is director of data science for environmental and climate health in the department of biostatistics at the Harvard T.H. Chan School of Public Health. She is also a research scientist at the Department of Data Science at Dana-Farber Cancer Institute.

The series is open to the public; registration is required. For more information, including how to register, visit: go.nih.gov/kSJr9NH

Individuals who need interpreting services and/or other reasonable accommodation should call Janiya Peters at (301) 670-4990. Make requests at least five days in advance of the event.

NICHD, NIBIB Launch Diagnosis Challenge

NICHD and NIBIB launched a new challenge, the NIH RADx® Tech ACT ENDO Challenge, which aims to accelerate the development of innovative technologies for diagnosing endometriosis. Endometriosis is a common gynecological condition that can take several years to diagnose.

Submissions are due Oct. 11, 2024.

For more information, including a link to the submission portal, see: https://go.nih.gov/Eb2mIgZ

All of Us Begins Enrolling Children

In its efforts to advance health research across the lifespan, NIH's *All of Us* Research Program has started limited enrollment of children, from birth through age 4, at five partner health care organizations across the country.

"Experiences of early childhood shape our lives into adulthood," said Dr. Josh Denny, chief executive officer of *All of Us*. "Data from children and parents will allow researchers to disentangle the biological, social and environmental influences that impact our health over time."

NIH has been working to include pediatric participants in *All of Us* since the program launched nationally in 2018. Recruiting this special population involved extensive planning, protocol development specific to children, and updates to the program's technology platforms.

The five partner organizations offering pediatric enrollment are: the University of Pittsburgh; University of Arizona and Banner Health; Henry Ford Health in Mich., San Ysidro Health in Calif. and Community Health Center, Inc. in Conn. For more information, visit www.allofus.nih.gov.

Nobel Prize-Winning Astrophysicist Speaks at NIAMS Retreat

BY GREG LAVINE

Dr. John C. Mather, a NASA senior astrophysicist, speaks to a NIAMS audience.

PHOTO: GREG LAVINE

Physicists peering outward to the farthest reaches of the universe and biologists seeking to capture details of the tiniest molecules share more in common than one might think.

A Nobel Prize-winning physicist from the National Aeronautics and Space Administration (NASA) spoke to a NIAMS audience and explained that investigating the mysteries of life is a thread that connects both scientific fields.

Dr. John C. Mather, a NASA senior astrophysicist, was a keynote speaker at a recent National Institute of Arthritis and Musculoskeletal Diseases (NIAMS) Intramural Research Program (IRP) event that convened established researchers and trainees.

Traditionally, the NIAMS IRP invites speakers from various fields to expose NIAMS scientists to other disciplines and, this year, Mather was one of several.

"Where do we come from?" said Mather, as he thought back to some of his earliest philosophical questions. "What does 'we' mean? What is a human being? Is life a miracle?"

When it comes to speculating about the rarity of life in the universe, the space science community is leaning toward an interesting observation.

"Some scientists are starting to describe life as a thermodynamic imperative. Life will always occur when given a chance," he said.

In the late 1960s, when Mather was an undergraduate at Swarthmore College, scientists were learning about the mystery of the universe's composition. Researchers had recently made a seminal discovery that cosmic background radiation filled what was once thought to be empty space.

Scientists like Mather wanted to analyze the visible and non-visible spectrum to gather clues about the universe. Different spectrums, for example, could reveal chemical reactions happening in distant worlds.

At the University of California at Berkeley, Mather's 1973 Ph.D. thesis documented his efforts to measure the cosmic spectrum. His team launched a high-altitude balloon, but it failed to gather the needed data.

> *"I am impressed by seeing the progress about what is now possible in biology."*
>
> -DR. JOHN C. MATHER

A year later, NASA put out a call for satellite research proposals. Mather dusted off his thesis and revised the plan to take readings from orbit.

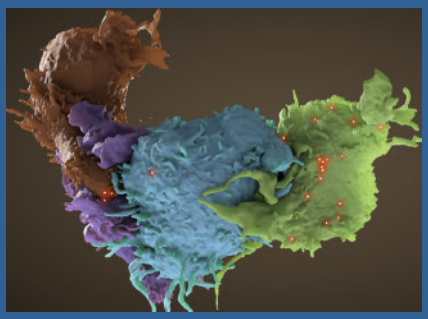
The plan became NASA's Cosmic Background Explorer Satellite (COBE), which ultimately involved more than 1,500 people to get off the ground. The satellite launched in 1989 and the data it collected supports the Big Bang theory of how the universe began.

Mather later served as the senior project scientist for NASA's James Webb Space Telescope, launched in 2021. The Webb telescope carried more advanced sensors that offered even clearer views of what is out there in the universe.

For each project, Mather stressed how much he relied on the expertise of thousands of colleagues, and that he could not fully understand all aspects of the project. He said he sees that same spirit of teamwork in the biomedical research field.

"I am impressed by seeing the progress about what is now possible in biology," he noted.

While Mather will leave the biology to the biomedical experts, he and his colleagues will continue to look to the stars to solve their own mysteries—perhaps someday including the origins of life.



ON THE COVER: *3D structure of HIV infected (blue, green) and uninfected (brown, purple) T cells interacting. One cell (brown) has wrapped an extension around its uninfected neighbor (purple) to reach an infected cell (blue). Data comes from focused ion beam scanning electron microscopy.*

IMAGE: DONNY BLISS, NLM; SRIRAM SUBRAMANIAM, NCI

The NIH Record

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National Institutes of Health
Turning Discovery Into Health

Ingrassia

CONTINUED FROM PAGE 1

Today, more than 230 families participate in the LFS clinical study that quantifies cancer risks and assesses psychological and social challenges faced by families with LFS. A subset of study participants come to the NIH Clinical Center for annual MRI-based cancer screening and to meet with clinician-scientists in the Clinical Genetics Branch (CGB).

Ingrassia came to NCI to discuss his family's story to a rapt audience in the Joseph F. Fraumeni, Jr. Conference Room, including some of the leading current and former scientists engaged in the study of LFS.

Ingrassia, at several moments overcome by emotion, described the evolution of his understanding of LFS and the project. His three siblings inherited the genetic variant associated with LFS from their mother, who died in her early 30s.

Only after his brother Paul was diagnosed with a second cancer in 2015, once the family learned about LFS, did Ingrassia himself get tested. His displayed the Myriad MyRisk test result on the big screen: "negative, mutation not detected." His family's story alone would not make a book, he said. Only with the stories of the researchers and other families could this idea expand into a book.

Drs. Elaine Shiang, Esther Chang and Kathleen Pirollo at the event

In partnership with investigators and staff at the NCI, Harvard and other institutions, he was able to track down "Family A" from the original 1969 paper in Annals of Internal Medicine. Members of the Kilius Family were still participating in the NCI LFS Study and, through the clinical nurse, agreed to be contacted.

> *"It was a truly inspiring day...that showcased how rare disease studies lead to insights applicable to the general population,."*
>
> -DR. SHARON SAVAGE-

The resulting tale is gripping and propels the book forward as it unfolds across multiple generations of the two families, the lives of the researchers and the scientific advances in cancer genetics resulting in the identification of TP53 and the development of clinical management protocols families with LFS.

The event was spearheaded by Dr. Sharon Savage, DCEG clinical director and CGB branch director, and Lasker Clinical Research Scholar Dr. Payal Khincha, who is principal investigator of the NCI LFS study.

"It was a truly inspiring day of science and reminiscing that showcased how rare disease studies lead to insights applicable to the general population," said Savage. Khincha added, "Events like these provide a critical reminder of the interconnectedness of physician-scientists and the valuable contributions of study participants."

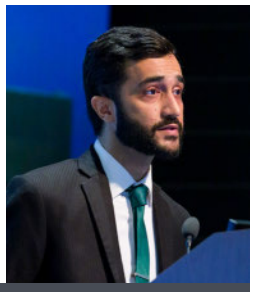
Front row (from l): Patricia Fraumeni, Dr. Esther Chang, Dr. Joseph Fraumeni, Dr. Elaine Shiang and Kathleen Pirollo. Back row (from l): William Blattner, Margaret Tucker, Lawrence Ingrassia, Sharon Savage, Payal Khincha and Robert Hoover

CC Hosts Inaugural Fellows Grad Ceremony

BY ERIC BOCK

The Clinical Center (CC) recently held its first-ever graduation ceremony in Masur Auditorium to mark the completion of training for clinical residents and fellows in accredited and nonaccredited graduate medical education programs.

The ceremony featured remarks from NIH Director Dr. Monica Bertagnolli, CC CEO Dr. James Gilman, and graduating fellows Dr. Mian Khalid and Dr. Hanna Blaney.



Dr. Hanna Blaney (l) and Dr. Mian Khalid (r)

PHOTOS: DANIEL SONE

"You have chosen the most noble profession, one that brings tremendous good to the world by directing the power of science to the service of humanity," said Bertagnolli via video message. "You face great challenges, but you're riding a great wave of new knowledge delivered by our country's robust investment in biomedical research."

Graduates received fellowship certificates from their individual program directors.

The CC sponsors 23 accredited graduate medical education programs. The programs help fellows realize their potential as a physician, physician-scientist, clinical investigator, or institutionally based academician.

During training, fellows often have the opportunity to work collaboratively with Nobel laureates, be mentored by world renowned physicians, participate directly in cutting-edge investigational protocols, and rotate to some of the nation's finest academic medical centers within the metropolitan Washington, D.C., region for additional clinical experiences.

The graduating class of fellows faced many challenges over their course of training, most notably the Covid-19 pandemic, Khalid said. Despite it all, they rose to the occasion and continued to advance clinical research when it mattered most.

"Our combined experiences in our disciplines proved that the CC is not just a research hospital—but rather a hospital that prioritizes patient care, irrespective of a patient's background, race, creed, national origin or ability to pay," he said. "We're proud to graduate from such a compassionate institution."

Being a fellow at NIH is a training experience unlike any other, said Blaney. Fellows with varying academic backgrounds routinely collaborate with one another to achieve the common goal of improving lives and understanding the nature of disease.

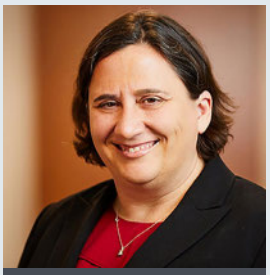
"Together, we have made differences in the lives of countless patients while advancing our understanding of diverse disease processes," she said. "Nowhere else can we delve into the humanity and inquiry fundamental to the practice of medicine and do so with such talented colleagues."

To watch the full ceremony, see: https://videocast.nih.gov/watch=54897.

The graduating class of 2024 poses outside the Clinical Center.

Hutter Selected As OSC Director

Dr. Carolyn M. Hutter has been appointed director of the NIH Office of Strategic Coordination (OSC), part of the Division of Program Coordination, Planning, and Strategic Initiatives in the NIH Office of the Director (OD).



Dr. Carolyn Hutter

OSC plans, manages and oversees activities funded by the NIH Common Fund, with a budget of nearly $700 million that supports bold scientific programs that catalyze discovery across all biomedical and behavioral research. These programs create a space where investigators and multiple NIH Institutes and Centers collaborate on innovative research expected to address high-priority challenges for the NIH as a whole and make a broader impact in the scientific community.

Hutter brings more than 20 years of experience in genetics and epidemiology as well as managing large research collaborations. She is currently director of the Division of Genome Sciences at the National Human Genome Research Institute (NHGRI). In this role, Hutter leads NHGRI's efforts in basic genomics research funding and program management. From her leadership position at NHGRI, she has gained extensive experience with all stages of Common Fund programs. She has worked with leadership across the agency to shape the initial concept and funding opportunities for several Common Fund programs and also has been involved in the renewal or transition of Common Fund programs.

She received a bachelor's degree in applied mathematics-biology from Brown University; a master's in genetics from Cornell University; a master's in biostatistics and a doctorate in epidemiology from the University of Washington, Seattle.

Hutter began her career at NIH as a program director in the Epidemiology and Genomics Research Program at the National Cancer Institute and in the Division of Genomic Medicine at NHGRI. She has held leadership roles in several large-scale consortia, specifically The Cancer Genome Atlas (TCGA), NHGRI Clinical Sequencing Evidence-Generating Research Program and the early stages of the *All of Us* Research Program.

Prior to joining NIH, she led and conducted laboratory, computational and epidemiologic research in population genetics, genetic association analysis and cancer prevention. As a senior staff scientist at the Fred Hutchinson Cancer Research Center, Hutter helped establish the Genetics and Epidemiology of Colorectal Cancer Consortium (GECCO), a collaborative effort involving researchers from North America, Europe, Asia and Australia.

Nelson

CONTINUED FROM PAGE 1

"You see me, but you are looking into the hands of so many people who have poured into me. People who have spent countless hours encouraging me, mentoring me... talking me off the ledge," laughed Nelson, a third-year Howard University medical student and special volunteer in NEI's Ocular Stem Cell and Translational Research Section (OCSTR).

Nelson grew up in Miami, the son of Haitian immigrants who moved to the U.S. in the late 1980s. His parents met while working at the Miami International Airport. At the time, his father was an aircraft mechanic; his mother a security worker. They are now a teacher and a respiratory therapist, respectively. Witnessing his parents pursue their true callings with resilience, Nelson said, inspired him to pursue his own, with passion and determination.

Nelson began his path to medical school at age 11 when his mother noticed him squinting at the television and took him to a Miami-area optometrist.

"I literally started to cry," said Nelson, recalling when the optometrist corrected his vision, and the world came into focus. Relief that his eyes had nothing wrong with them, other than needing glasses, gave way to curiosity about vision; the optometrist offered to let Nelson shadow him in clinic.

Later, during high school, Nelson was shadowing an ophthalmologist at the Hollywood Eye Institute when he stumbled across a pamphlet about NEI's DIVRO summer intern program on the NIH campus.

"Since 2011, DIVRO has given dozens of young people from communities underrepresented in biomedical research the opportunity to train at NEI," said Dr. Cesar Perez-Gonzalez, who manages DIVRO. "We're now reaping the rewards from this investment, as our earliest alumni are finishing graduate or medical school and entering the workforce in vision research."

Nelson interned with NEI as an undergrad between his freshman and sophomore years at Columbia University. Under the mentorship of Dr. Mitra Farnoodian, and Dr. Kapil Bharti, he characterized function of a protein in the eye called ABCA4, which plays an important role in transporting waste out of the retina's metabolically

Nelson at the research bench in the NEI Ocular Stem Cell and Translational Research Section

active photoreceptors and into the adjacent support tissue called the retinal pigment epithelium. Importantly, several inherited retinal diseases, like Stargardt disease, disrupt ABCA4 function, leading to vision loss. Understanding how these diseases affect ABCA4 can contribute to developing treatments to preserve vision for those affected.

While at Columbia, Nelson also became interested in public health, traveling to Haiti as part of a 4-month global health security fellowship to study infant mortality and maternal health.

"I jumped at that opportunity because this was my time to speak Haitian Creole, connect with my Haitian roots and also bridge together my passion for public health and research." In Haiti, Nelson examined factors contributing to health disparities between rural and urban areas of the country.

After graduating from Columbia, Nelson entered medical school at Howard University. He is starting his third year this fall. Feeding his dedication to public health, he is now president of the Howard University College of Medicine Sight Savers Club, an ophthalmology special interest group that among other activities provides eye disease screening at local health fairs. As president, he hopes to bring back the Howard mobile eye clinic to the Metro Washington area.

Nelson is continuing his research with NEI's Bharti as a special volunteer. He said he's grateful for the experience and for the relationships he cultivated at the NIH, which he said helped open the door to medical school.

"Biomedical research is an inherently expensive enterprise. Unlike many things in our budget, our investment in people is appreciating," said Bharti. "Programs like DIVRO help us provide opportunity to talented young people who otherwise might not find it. Thinking about Luke's success, it's easy to see now how the program benefits NEI and NIH."

As for Nelson's future, he has a strong desire to give back to his community. His goal is both simple and ambitious: "I believe everyone should have access to the best vision possible."

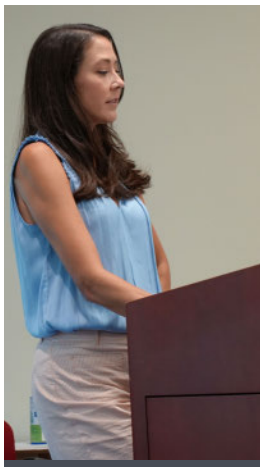
For more about the DIVRO summer internship, see: https://go.nih.gov/SL21XrA.

The NEI DIVRO Class of 2018. Nelson is standing (6th from l) and Dr. Cesar Perez-Gonzalez, who manages DIVRO, is kneeling in front.

SCRIBES IN TRAINING

'Curious Science Writers' Visit NIH Campus

BY AMBER SNYDER



Event organizer and OACU program analyst Angela Szwec

A new generation of science writers visited campus on July 18. The aptly named Curious Science Writers visited with researchers, science writers and staff from the Office of Animal Care and Use (OACU) and the National Institute of Dental and Craniofacial Research (NIDCR).

Curious Science Writers (cSw) is a program for high school students hosted by Americans for Medical Progress (AMP). The young people are paired with their own science communicator/writer mentor, and research and write their own article with the mentor's guidance. Mentors are volunteers and hail from various organizations across the country, including NIH.

High school students Olivia Wood, Cindy Lin and Pranav Boreddy visited NIH as part of a week-long boot camp of activities intended to prepare them to embark on their own science writing journey. The day's events were also opened to student interns from NIDCR (Activities were hosted in Bldg. 30, home of the institute).

Students listened to guest lectures in the morning and toured an animal facility after lunch. The list of presenters included Angela Szwec, OACU program analyst; Tiffany Chen, a science writer at NIDCR; Dr. Brenda Klaunberg, animal imaging program director at the National Institute of Neurological Disorders and Stroke (NINDS); NIDCR biologist Lynn Vitale-Cross; Dr. Lauren Davidson, director of the NIDCR veterinary resources core; and NIDCR facility manager David Mallon.

Chen, a science writer with the Science Communication and Digital Outreach Branch at NIDCR, regaled her audience with a tale about noticing an inaccuracy in her local newspaper when she was in high school. She doubted herself at first—she was "just a kid," and surely the writer had checked their facts, she thought. The next day, however, the newspaper printed a correction that confirmed her suspicions.

Above, the rapt audience was treated to a morning of educational talks. Below, writers chat during a break.

PHOTOS: MAHELATE SOLOMON

"Adults aren't always right," Chen reminded her audience. Young people are capable and should value their own unique perspective as budding writers.

An oft-repeated bit of advice from speakers was to use storytelling to make complex subject matter easier to understand. Vitale-Cross emphasized that point in her presentation. As a biologist conducting research in the adult stem cell section of Dr. Eva Mezey's lab, her research is both fascinating and complicated.

"You have to tell a clear and concise narrative in order to tell your science story," Vitale-Cross said.

Wood, Lin, Boreddy and the rest of their cSw peers now have the rest of the summer to write and polish their respective articles. The finished work will be published on https://curioussciencewriters.org.

To read about cSw visits in previous years, go to go.nih.gov/yvaZAjz and https://go.nih.gov/lWhQHQu.

cSw students and speakers: Back row (l to r): Jim Newman, Szwec, Jennifer Huber, Dr. Brenda Klaunberg, Dr. Lauren Davidson, Lynn Vitale-Cross and Carrie Gibson. Front row (l to r): Amber Snyder, Cindy Lin, Pranav Boreddy and Olivia Wood

Zebrafish

CONTINUED FROM PAGE 1

"Zebrafish are great for studying development," said Kindt, senior investigator in NIDCD's section on sensory cell development and function. "We can use modern tools to see what's happening to hearing in a living animal."

Most of the research her lab conducts takes place in zebrafish embryos and newly hatched larvae. That's because zebrafish are transparent at very young ages.

"We can watch each and every cell division and every morphological event that happens as an embryo develops," she said.

Zebrafish are a particularly useful model for hearing and balance research because of their transparency. Scientists can study the development of sensory cells of the inner ear in zebrafish in real-time.

Called hair cells because of hair-like structures located on top of each cell, these sensory cells detect sound and help maintain balance. Special connections called ribbons sit at the bottom of each hair cell. These ribbons can be lost due to loud nose, aging or ear-toxic drugs. The loss of these connections disrupts sound signaling to the brain, ultimately leading to hearing loss.

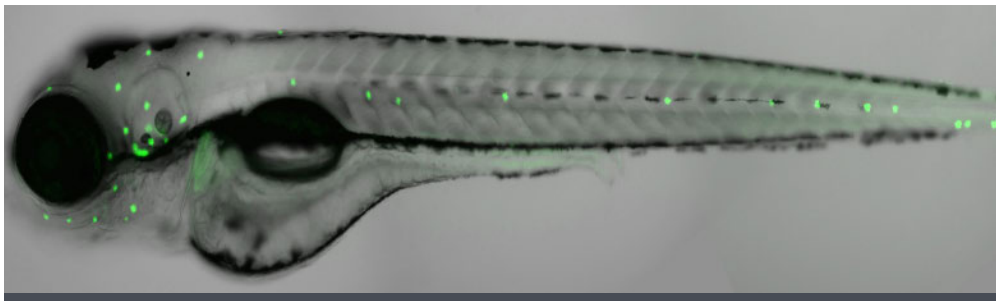
"What's also really powerful about being a transparent animal is that we can use really cool tools for our research," Kindt said. "One of those is green fluorescent protein, or GFP."

Originally identified in jellyfish, GFP glows fluorescent green when exposed to blue light. GFP can be introduced into zebrafish. Kindt's lab genetically engineers zebrafish with GFP in hair cells. This approach helps them see every hair cell.

Experiments like these are impossible in humans and other mammals. That's because hair cells are embedded in one of the body's densest bones. There is no way to study these cells without removing the ear.

The fish have hair cells in two places: in their ear and down the side of their body. The hair cells in their ear are used for hearing and for balance. The hair cells that run down the side of their body are part of the lateral-line system. Lateral line hair cells are directly on the fish's skin. These cells help zebrafish to sense local water movement.

"It's important for a lot of behaviors for fish, like breeding, prey detection and predator avoidance," she said. "Some fish use their lateral line for a behavior called schooling."



Kindt's lab genetically engineers zebrafish with green fluorescent protein or GFP in hair cells. This approach helps them see every hair cell.

Currently, her lab is studying how the ribbons at the bottom of the hair cell form connections to the brain in zebrafish. By understanding how these connections form normally, "we can understand how to reform them after they are lost in cases of hearing loss."

Dr. Saman Hussain, a scientist in Kindt's lab, recorded the development process using video technology.

In young hair cells, tiny ribbons are at the top of a hair cell. As the cell matures, ribbons move from the top to the bottom on cellular highways called microtubules. During their migration, the ribbons fuse together to create larger ribbons.

"By using movies, we're able to tell the whole story and piece together what's happening during this developmental process," Kindt concluded. "We might've been able to guess this process, but seeing is believing in development. We're scientists, we can't guess. We have to know what happens."

To watch the lecture in full, visit https://videocast.nih.gov/watch=54530.

NIH Releases New Respiratory Virus Guidance

NIH has released Respiratory Virus Guidance, a plan that addresses respiratory virus safety topics in detail, including the framework for safely working during periods of increased respiratory virus activity levels.

The new guidance—issued by NIH's Office of Research Services Division of Occupational Health and Safety (DOHS)—reflects the latest recommendations from the Centers for Disease Control and Prevention and focuses on prevention of transmission by adhering to risk-based safety principles such as self-monitoring, ventilation and filtration, vaccination and workplace flexibilities.

The guidance includes links to important information on the current trends in respiratory virus transmission. With this knowledge, staff can be informed of current community risks and take appropriate steps to protect themselves, their colleagues and their families. This guidance is not mandatory in non-healthcare settings. Healthcare specific requirements can be found throughout the plan.

NIH issues new respiratory virus guidance.

PHOTO: METAMORWORKS/SHUTTERSTOCK

All members of the NIH community are encouraged to review the updated guidance and integrate these practices into daily routines. To read the plan, visit: https://ors.od.nih.gov/sr/dohs/safety/NIH-respiratory-virus-guidance/Pages/default.aspx.

For any questions or further information, please contact DOHS at 301-496-2960.

Increases Found in Preteen Suicide Rate

PHOTO: SEWCREAMSTUDIO/SHUTTERSTOCK

NIH researchers have found that rates of preteen suicide (ages 8-12) have been increasing by approximately 8% annually since 2008. These increases were most pronounced among female preteens, American Indian/Alaska Native or Asian/Pacific Islander preteens and Hispanic preteens.

While the overall number of preteen suicides is small compared to teen and adult populations, the researchers say the findings from this analysis underscore the need for age-appropriate and culturally responsive prevention efforts that include suicide risk screening and lethal means safety counseling. The findings also highlight the need to better understand, identify and help preteens who may be at risk for suicide.

The researchers found:

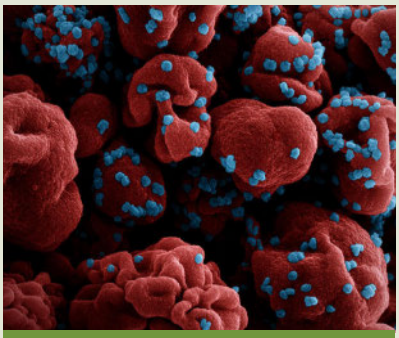
- Female preteens had a disproportionate increase in suicide rate
- Black preteens had the highest overall suicide rate.
- Hispanic preteens had the greatest percent increase in suicide rate.
- Hanging and suffocation were the most common suicide methods, but firearms were the most rapidly increasing suicide method.

Using 2001-2022 data from the Centers for Disease Control and Prevention's web-based injury statistics query and reporting system for U.S. youth, the researchers examined suicide deaths overall and by sex, race, ethnicity, suicide method and geographic region.

The study was conducted in collaboration with colleagues from The Ohio State University College of Medicine and Nationwide Children's Hospital, Columbus, and researchers at the Washington University School of Medicine, St. Louis. The study appears in the journal *JAMA Network Open*.

Study Suggests Covid-19 Reinfections Have Similar Severity as Original Infection

Using health data from almost 213,000 Americans who experienced Covid-19 reinfections, researchers have found that severe infections from SARS-CoV-2—the virus that causes Covid-19—tend to foreshadow similar severity of infection the next time a person contracts the virus. Additionally, scientists discovered that Long Covid was more likely to occur after a first infection compared to a reinfection.



Colorized scanning electron micrograph of a cell (red) infected with SARS-CoV-2 virus particles (blue), isolated from a patient sample

IMAGE: NIAID

The study, funded by NIH's Researching Covid to Enhance Recovery (RECOVER) Initiative, is published in *Communications Medicine.*

The analysis utilized data from the National Covid Cohort Collaborative (N3C). Researchers focused on individuals originally infected between March 2020 and Dec. 2022, and experienced a second infection by March 2023. Covid-19 vaccines, though not available during the entire study period, correlated with a protective effect.

About 27% of those with severe cases, defined as receiving hospital care for a coronavirus infection, also received hospital care for a reinfection. Adults with severe cases were more likely to have underlying health conditions and be ages 60 or older. In contrast, about 87% of those who had mild Covid cases the first time also had mild cases of reinfections.

Covid reinfections occurred at least two months after a first infection. They were most frequent when omicron variants were circulating in late 2021 and early 2022. Waning immunity and increased exposure to the coronavirus, including the highly infectious variants, likely accounted for the uptick.

Scientists also discovered that regardless of the variant, Long Covid—defined as experiencing long-term Covid-19 symptoms such as tiredness, coughing or having difficulty sleeping, breathing or thinking after an acute coronavirus infection—was more likely to occur after a first infection compared to a reinfection.

Researchers also found that lower levels of albumin, a protein made by the liver, may indicate a higher risk for reinfection. This finding could indicate lower albumin as a possible risk marker for reinfection.

The study is supported by NIH's RECOVER Initiative and NCATS.

NIH Researchers Discover Potential Target for Degenerative Eye Disease

NIH researchers have discovered the source of dysfunction in the process whereby cells in the eye's retina remove waste.

A report by scientists at NIH and Johns Hopkins University, Baltimore, details how alterations in a factor called AKT2 affects the function of lysosomes and results in the production of drusen deposits in the retina, a hallmark sign of dry age-related macular degeneration (AMD). According to the researchers, the findings suggest drusen formation is a downstream effect of AKT2-related lysosome dysfunction and points to a new target for therapeutic intervention.

Key cells that make up the retinal pigment epithelium (RPE) provide oxygen and nutrients to the retina's energetically active neurons. They also collect and process the retina's waste products through lysosomes, which act as the cells' garbage disposals. Failure in the cells' ability to process these waste products leads to the formation of drusen. As AMD progresses, drusen increase in number and volume. But despite intensive research, drusen formation is still largely a mystery.

The researchers manipulated AKT2 expression levels in the RPEs of mice. When they overexpressed AKT2, lysosomes lost normal function and the mice developed dry AMD symptoms such as RPE degeneration. The researchers observed similar features in RPE cells from human donors with AMD and in RPE cells generated from patient stem cells. Cells from donors who possessed a gene variant called CFH Y402H, which increases AMD risk, had relatively greater expression of AKT2, showed functionally defective lysosomes, and formed drusen deposits.

This study's findings form the basis for a possible future treatment for dry AMD, for which no therapy currently exists. AMD is one of the most common causes of vision loss in the U.S. People with dry AMD develop drusen in an area of the light-sensing retina called the macula that people use for sharp, central vision.

The study builds upon previous work published NEI's Section on Ocular Stem Cell and Translational Research Section.

NIH Receives 15 HHS Green Champion Awards

NIH received 15 Department of Health and Human Services (HHS) Green Champion Awards for fiscal year 2023.

Through the 17th annual Green Champion Awards, HHS honors individual federal employees and Native American tribal members, small groups, and projects or programs that demonstrate measurable results towards integrating sustainability principles into the HHS mission and its daily operations.

The awards are given to employees who take on the challenge of reducing energy use, saving natural resources and minimizing the carbon footprint of the federal government.

Winners were celebrated at a virtual ceremony earlier this summer.

NIEHS Green Champion awardees from 2022 and 2023

PHOTO: STEVE MCCAW/NIEHS

The Green Champions from NIH are:

Sustainability Innovator

Individual

Patrick Shirdon, the National Institute on Aging's Director for Management, for facilitating "the effective communication of the requirements of Executive Orders 14008 and 14075 and the HHS Climate Adaptation Plan by supporting the development and delivery of multi-media informational resources tailored to specific NIH workforce audiences."

Small Group

Helen Cawley, Jessica Hale, Helena Celia Cerda-Kun, Minoo Shakoury and Kerri Hartung of the NIH Freezer Challenge Steering Committee for voluntarily working "to promote sustainability while still carrying out their official duties within their institutes. As a team, they collaborated to increase the NIH involvement in the national and global effort to reduce energy use and respective emissions from laboratory freezers."

Kerri Hartung, Paul Johnson, Bill Steinmetz, Cheryl Thompson, David Christie, Stephanie Bishop, Lisa Padilla-Banks, Andrea Kaminski, Lt. Cdr. Justin Bunn and Paul Windsor of the National Institute of Environmental Health Sciences (NIEHS) Recycling Program Innovation for assisting "institute personnel to correctly recycle in the workplace." The team "took an innovative, multi-faceted approach that combined updated digital resources and physical signage, in-person engagement, on-line interactive quizzes, and development of an online interactive recycling database for laboratories."

Project/Program

The 2023 NIH Green Labs Program for helping labs "learn about myriad environmental programs that are either mandated by federal, state, or local law or internal NIH or HHS policies and best management practices to reduce environmental impacts from lab activities."

Building Sustainable Supply Chains

NIH Sustainable Laboratory Supply Chain Strategy for expanding "the use of sustainable products and services while also reducing costs and emissions through the effective management of a common laboratory supply stock room."

Environmental Stewardship

Small Group

David Mohammadi, Matt Deptola, Ty Adkins, Mike Stefan of the NIH Division of Environmental Protection for developing "a comprehensive Chemical Waste Compliance poster."

Willie Davis, Christopher J. Batzel, Sr., Javier Arce-Colon, Kimarlo Burke, Michael Turner of the NIH Division of Logistics Services' Property Management Branch, Property Reutilization and Disposal Section for engaging with ICs to collect, manage, and redistribute excess property."

Paul Poliachik, Brian Harris, William Ragland, Ben Hocutt, Paul Johnson of NIEHS for developing a solution to transport soiled animal bedding to a power plant where the bedding would be used to produce electricity. 30-yard dumpsters with augers were obtained to condense the bedding to reduce trips to the collection site.

Norman Hall, Dina Pokuaa, Tofic Rahmeto, Randy Caudle, Belinda Avila, Katina Elie, Georgine Hunter, Christopher Doleman, Wondwesen Gebrecrstos, Netsanet Fita of the Clinical Center's Nursing Department's Sterile Processing Section for significantly reducing "the environmental impact of sterilization packaging for surgical devices in the operating room."

Advancing Climate Adaptation and Resilience

Small group

Joseph Cox, Anna Centeno, Steve Friedman, Jaroslav Sebek for hosting Bike to Work Day. National BTWD recognized NIH as the largest participant of the 100-plus pit stops for the D.C., Maryland, and Virginia region.

Bill Steinmetz, Kerri Hartung, Paul Johnson, Julie Johnson, Rachel Faison of NIEHS for implementing a "Refrigerant Management Plan"

Electrifying and Optimizing the Federal Fleet

Individual

Lt. Brian Sims, Fleet Manager for the NIH Police Department, for "researching the most cost-effective and beneficial way to begin replacing the NIH Police gas vehicles with hybrid and plug-in electric police vehicles."

Decarbonizing Federal Buildings

Small group

Ellen M Rolfes, Emily E. Neveux, Jon W Garvey, Patricia Ann Messick, Bryan James Wedel, Andre Nicholas Hogan, Danielle Denise Buice, Catherine L Brooks, Brandy L Robinson, Aimee Louise Mooney of the National Human Genome Research Institute (NHGRI) for developing "the NHGRI 2023 Freezer Replacement Program to Decarbonize NHGRI Labs."

Alison Karver, Cameron Thompson and James Stancil of NIEHS Office of Research Facilities for completing "the replacement and refurbishment of the Bldg. 101 Module D Roof, covering an area of approximately 16,000 square feet.

Michael Shaw, Jr, Vanessa Argote Macia and John Louis Fratangelo of the NIH Central Utility Plant for "achieving cost savings through improved steam condensate return."

A full list of winners and award summaries can be found at https://intranet.hhs.gov/about-hhs/annual-initiatives/go-green/green-champions.

NIEHS's Kunkel Elected to NAS

BY MARLA BROADFOOT

Longtime NIEHS researcher Dr. Thomas Kunkel was among 124 new members and 24 international members elected to the National Academy of Sciences (NAS) earlier this year in recognition of their distinguished and continuing achievements in original research.

"I am very proud of this accomplishment, both for me personally and for what it says about the tremendous support that has made it possible," said Kunkel, the NIH Distinguished Investigator in the Genome Integrity and Structural Biology Laboratory. "That support has been constant for more than 40 years, from both NIEHS and the National Institutes of Health, as well as from the many people who have contributed to our group's success, including my colleagues here and throughout the world."

Being elected to the academy is considered one of the highest honors that a scientist can receive. New members are chosen by current members through a process that recognizes individuals who have made major contributions to the advancement of science.

Dr. Philip Hanawalt of Stanford University and an NAS member since 1989, noted that Kunkel has contributed seminal discoveries for more than four decades.

"Tom Kunkel is an internationally acclaimed leader in the field of genomic stability, whose impeccable integrity, outstanding mentorship and ability to deliver exemplary lectures on his work are also notable," Hanawalt said after learning of Kunkel's election.

"He is responsible for much of what we know about the factors that control the precision of chromosome replication," added Dr. Paul Modrich, a NAS member and 2015 Nobel Prize in Chemistry winner. "In my view, his election to the NAS is long overdue."

Outstanding science

Kunkel's research focuses on DNA replication, the process by which a cell makes an identical copy of its DNA. This process is essential for cell division, growth and repair. Kunkel's research has largely focused on DNA polymerases, the enzymes responsible for synthesizing new DNA strands during replication. Kunkel's work has revealed important insights into how DNA polymerases function and how errors in DNA replication can lead to mutations that make people more susceptible to diseases like cancer.

One of Kunkel's key contributions is his study of DNA replication fidelity, or the accuracy with which DNA polymerases copy genetic information. He discovered that DNA polymerases have proofreading capabilities, meaning they can recognize and correct mistakes made during replication. This insight has greatly enhanced the understanding of how cells maintain the integrity of their genetic information.

Accurate DNA replication maintains genetic information over many generations and avoids disease-causing mutations. Inaccurate DNA replication benefits evolution, survival of viruses and microbes in adverse environments, and development of the immune system. Among his many discoveries, Kunkel showed that the polymerase responsible for replicating the HIV genome is highly inaccurate, explaining the emergence of drug-resistant forms of the virus.

"Dr. Kunkel's work uses techniques from structural biology, biochemistry, genetics and genomics to understand how mutations are avoided or generated during DNA replication," said NIEHS Scientific Director Dr. Darryl Zeldin. "Because mutations are relevant to much of biology, his research has advanced several fields, from evolution to the origins of human disease."

Expert advice

With their election, Kunkel and his peers make a commitment to volunteer their services for National Academies activities. NAS works alongside the National Academy of Medicine and the National Academy of Engineering to provide independent, objective analysis and advice to the nation, and it conducts other activities to solve complex problems and inform public policy decisions.

The newly elected members bring the total number of active members to 2,617 and the total number of international members to 537.

NAS Elects Four NIH Scientists

This year's NAS inductees are, (clockwise from top l): Dr. Thomas Kunkel, NIEHS; Dr. Sandra Wolin, chief of NCI's RNA biology lab; Dr. Giorgio Trinchieri, chief of NCI's lab of integrative cancer immunology; Dr. Kyung Kwon-Chung, distinguished investigator and chief, clinical immunology lab, NIAID

NIH'er Receives Social Worker of the Year Award

CAPT Anthony Johnson

CAPT Anthony Johnson, scientific advisor and training director in the Division of Intramural Research, recently received the 2024 Social Work Professional Advisory Group (SWPAG) senior social worker of the year award.

Each year, the award is presented to social work health services officers in the Commissioned Corps of the U.S. Public Health Service (USPHS) for demonstrated outstanding accomplishments, exceptional leadership ability and exemplary service, while substantially advancing the health of the nation through innovative and strategic solutions as well as significantly impacting the mission of the Corps.

VOLUNTEERS

Sickle Cell Study Seeks Volunteers

The umbilical cord blood is rich in stem cells, which can be used in new sickle cell therapies. A research study at NIH is looking for women between 18 and 45 years of age with a risk of having an infant with sickle cell disease to donate their baby's umbilical cord. There is no cost for medical procedures. For information on how you can participate, contact the Office of Patient Recruitment at 866-444-8810, and refer to study #01-H-0122 ccopr@nih.gov. For more information, see: https://go.nih.gov/6KDclKd

Eczema Study: Help Relieve the Itch

Eczema is a stubborn skin problem that shows up as redness and intense itching. Eczema can affect people of all ages but it's more common in infants and young children. NIH doctors are looking for volunteers aged 3-21 for an eczema study. For information on how to participate, contact Patient Recruitment at 866-444-8810, ccopr@nih.gov. Refer to study #15-I-0162. For more, see: https://bit.ly/3BGyFLD

At left, Dr. Maryland Pao, (l) clinical director of NIMH, discusses her research. At right, Dr. Daniel Pine (c) addresses the group in the hallway outside the CC's Pediatric Unit.

Senate Staffers Visit NIH to Discuss Mental Health

Staff from the bipartisan Senate Mental Health Caucus toured several Clinical Center (CC) labs in July.

The delegation toured the CC's outpatient pediatric unit where Dr. Daniel Pine, chief of the Section on Development and Affective Neuroscience, demonstrated novel treatments developed for pediatric mood and anxiety disorders. He also discussed his research on the connections among brain development, emotion regulation and risk for mood and anxiety disorders in children and adolescents.

In the Neuroscience and Novel Therapeutics Unit, lab chief Dr. Melissa Brotman discussed an exposure-based cognitive-behavioral research therapy developed for children and adolescents with severe irritability and other mood disorders. Brotman also shared ways she's using mobile apps to assess children's behavior.

In Brotman's lab, the group heard from a patient and her family, a highlight of the visit. "It brought tears to my eyes to hear her story," said one Hill staffer.

The group then visited the Noninvasive Neuromodulation Unit. There, Dr. Sarah Holly Lisanby, director, Division of Translational Research at the National Institute of Mental Health (NIMH), demonstrated transcranial magnetic stimulation (TMS) therapy, a non-invasive procedure that uses magnetic fields to simulate nerve cells in the brain. This experimental therapy, developed at NIH, has been shown to rapidly improve symptoms of treatment-resistant depression.

During the visit, a lively exchange ensued in the CC's Medical Boardroom after a roundtable discussion on youth mental health led by National Institute on Drug Abuse (NIDA) Director Dr. Nora Volkow, NIMH Acting Director Dr. Shelli Avenevoli and National Institute of Child Health and Human Development (NICHD) Deputy Director Dr. Alison Cernich.

ABOVE, Dr. Melissa Brotman BELOW: NIDA Director Dr. Nora Volkow (r) discusses her research as NIMH Acting Director Dr. Shelli Avenevoli looks on.

ABOVE: Standing l to r: Rebecca Unruh (Sen. Pete Ricketts); Aaron Sanchez (Sen. Laphonza Butler); NIH OLPA senior analyst Diane Hill; NIH Associate Director Kate Klimczak; NICHD Deputy Director Dr. Alison Cernich; Cameron Morra (Sen. Thom Tillis); Avenevoli; Katie Brown (Sen. Susan Collins); Volkow; Maria Olson (Sen. Susan Collins); Pao; Nimit Jindal and Naomi Plasky (Senate HELP Committee). Seated (l to r): Nadia Laniyan (Sen. Cory Booker); Madison Polk (Sen. Raphael Warnock); Emilie Benson (Sen. Tina Smith); Rachel Fybel (Sen. Tina Smith); Ruth McDonald (Sen. Amy Klobuchar) and Zilly, the Children's Inn at NIH therapy dog. **PHOTOS: CHIA-CHI CHARLIE CHANG**

The delegation gets a TMS demo in Lisanby's lab.