

MULTIPLEXING BIOLOGY

Shendure Shares Trek Along 'New Frontiers in Genomics'

BY CARLA GARNETT

Remember when the cineplex concept debuted and a family could pile into the car for a trip to one big theater where everyone could see a different movie at the same time in the same place? Saved a lot of time, effort and angst, didn't it?

In recent years, longtime NIH grantee Dr. Jay Shendure has been focused on applying a similar idea to genome science. He discussed his work recently in Lipsett Amphitheater at the 15th installment of the Jeffrey M. Trent Lecture in Cancer Genomics.

"A common thread that runs through our



Dr. Jay Shendure discusses powerful new technologies during his Trent Lecture at NIH.

work is, can we multiplex biology—at every level and in as many flavors as we can?" Shendure began. "Think about technologies like next-gen sequencing, exome sequencing, massively parallel reporter assays... the performance of multiple experiments within a single volume...It's a very technical theme as opposed to a disease or a particular physiologic mechanism, but still one that I think is very powerful."

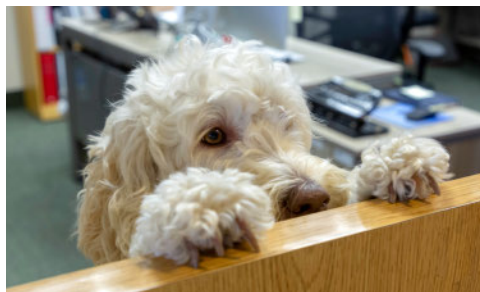
HHMI researcher and professor of genome sciences at the University of Washington, Shendure also serves as director of the Allen Discovery Center for Cell Lineage and director of the Brotman-Baty Institute for Precision Medicine.

"I regard Jay as one of the most highly accomplished genome researchers of this decade—full stop," said NHGRI director Dr. Eric Green, who introduced the guest speaker.

Shendure joined a long, storied list of speakers delivering the annual talk named for NHGRI's founding scientific director.

"This is really a lecture series of rock stars in honor of a rock star," enthused current NHGRI scientific director Dr. Dan Kastner, opening the event. "Through his vision, through his energy, through the dint of his hard work, Jeff quickly created an entity that was an engine that transformed the

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Children's Inn service dog Zilly peers at New Democrats visiting the inn; see p. 2.

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'THEY ARE BEAUTIFUL'

Klion Examines Role of Eosinophils in Health, Disease

BY RICH MCMANUS



Dr. Amy Klion

Birds have them. Bees may have them. So do sea cucumbers and giant cockroaches. Eosinophils—primitive cells that have been described in all vertebrates, and which can probably be found in invertebrates, too—are longtime lodgers

within the human frame.

When they stay where they are supposed to—that is, not in the lung, esophagus or skin—they are useful, even beautiful, says Dr.

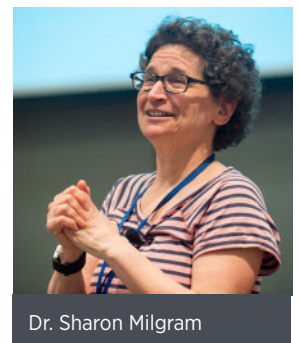
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Pride Event Addresses Sexual and Gender Minority Issues

BY MOHOR SENGUPTA

This year is the 50th anniversary of the Stonewall riots in New York City that triggered a demand for recognition and acceptance in mainstream society by the LGBTQ community. Because of that, this year's Pride Month was special in many ways, not just for the community at NIH, but also globally.

"It became one of the most satisfying experiences," Dr. Sharon Milgram, director of the Office of Intramural Training and Education, said of the NIH Academy



Dr. Sharon Milgram

SEE PRIDE, PAGE 8

New Mandatory Anti-Harassment Training Offered Online

In line with its commitment to achieving a harassment-free work environment, NIH launched a new online anti-harassment training module in August. Training goals are to educate individuals in the workplace to prevent harassment and to raise awareness of what constitutes harassment and the consequences of harassing behavior to stamp out instances where they may exist. The new training is mandatory and encompasses the requirements for the No FEAR and prevention of sexual harassment (POSH) training.

Previously, only federal employees were required to take No FEAR and POSH training within 90 days of onboarding and every 2 years thereafter. The new module is required for NIH employees, trainees, fellows and contractors. Additionally, the training must be taken annually and is due by Nov. 15 of each year. Failure to comply with the requirement will result in disablement of an employee's active directory accounts until the requirement is met. Employees whose active directory accounts are disabled are unable to sign into their computer or access emails.

To learn more about EEO mandatory training for NIH, visit the Office of Equity, Diversity and Inclusion website at <https://www.edi.nih.gov/training/mandatory-training>. Contact <https://www.edi.nih.gov/training/contact> with any questions you may have regarding the new anti-harassment training.

Lurie Prize Nominations Now Open

Nominations are now open for the 2020 Lurie Prize in Biomedical Sciences. This annual \$100,000 prize recognizes the outstanding achievement of a promising young scientist in biomedical research. The prize will be presented by the Foundation for the NIH at its award ceremony in Washington, D.C., on May 20, 2020.

You can nominate a colleague for the prize at fnih.org/LuriePrize from now until Sept. 12 at 5 p.m. The awardee will be selected by a jury of six distinguished biomedical researchers, chaired by Dr. Solomon Snyder of Johns Hopkins University School of Medicine.

Ideas Welcome for Childhood Cancer Data Sharing

The National Cancer Institute invites you to share your ideas for enhancing data sharing as part of the Childhood Cancer Data Initiative (<https://cancerresearchideas.cancer.gov/a/index>).



'New Democrats' Visit NIH

Four members of the New Democrat Coalition visited NIH on the afternoon of July 15, arriving at the Children's Inn at NIH for a working lunch with NIH leadership, then dropping by the Clinical Center for a tour of NINR's traumatic brain injury lab. The lawmakers also visited NIAID's primary immune deficiency clinic in Bldg. 10. Shown above at left are (from l) Rep. Angie Craig (MN), Rep. Lucy McBath (GA), Rep. Bill Foster (IL) and Rep. Chrissy Houlahan (PA), the coalition's freshman leadership representative. Above at right, NIAID director Dr. Anthony Fauci (l), Foster and Dr. Alexandra Freeman of NIAID discuss primary immune deficiency.

PHOTOS: MENA BRUNETTE



Houlahan participates in the working lunch.



McBath discusses issues with NIH leadership.

The online engagement platform allows you to submit ideas under six categories, each representing a component crucial to advancing progress against childhood cancer through enhanced data sharing and use. NCI will review all ideas submitted to the site to make the most of a proposed \$50 million annual increase to NCI's budget to address childhood cancer.

The site will be open until Aug. 23. Consider submitting an idea or sharing the link with your colleagues.

NIH Video Debuts Online

A new video about NIH and its important lifesaving work recently debuted. The nearly 7-minute recording is featured on www.nih.gov for the 13.8 million people who come to the website every year to learn about the NIH mission and to get

evidence-based health information. You can also see it at the NIH Visitor Center, where the more than 650,000 people who visit NIH's main campus each year are welcome to view it.



"The video captures the spirit of NIH and the incredible people who work and volunteer here," said NIH director Dr. Francis

Collins. "It certainly makes me proud to be a part of this amazing agency...For so many, we are the National Institutes of Hope, and this video tells the story of our contributions to science, medicine and humanity." Watch the video at <https://www.nih.gov/about-nih>.

Adjei Discusses Cancer Drugs, Underrepresentation in Trials

Dr. Alex Adjei of the Mayo Clinic presented the latest talk in the Continuing Umbrella of Research Experiences (CURE) Distinguished Scholars Seminars, which recognize outstanding former CURE scholars. Speakers are pursuing leading-edge cancer or cancer health disparities research and personify efforts to advance workforce diversity.

Early in his career, Adjei became part of the first class of scholars in the NCI Center to Reduce Cancer Health Disparities' CURE program, earning a CURE K01 award in 1997.

In his talk "Successes and Challenges in Early Phase Drug Development for Cancer Therapy," Adjei described work done throughout his career in developing cancer therapies.

Today, as an internationally recognized pioneer in drug development and thoracic oncology, Adjei is professor of oncology and pharmacology at the Mayo College of Medicine and director of early cancer therapeutics at all three Mayo Clinic sites. He has spent more than 30 years evaluating mechanisms of drug action and synergistic drug combinations and applied his expertise to advance the treatment of lung cancer.

During his recent presentation, he discussed a career developing cancer therapies.

"We learned..." "We've learned a lot." "We realized..." These are among the ways he referred to discrete lessons he and team members gathered from early studies in his career. These lessons have fed into and guided the development of new therapies for patients, which have resulted in a better understanding of cancer and how to prevent it.

In his current work, Adjei is studying how to improve the effectiveness of immune checkpoint inhibitors which, while being active, do not shrink tumors more than 50 percent, with perhaps a few exceptions.

"What this means is that—in spite of all the hype—the majority of patients don't always derive a lot of benefit," from immune checkpoint inhibitors, he said.

How does he hope to address this problem?



Dr. Alex Adjei receives his CURE DSS award from Dr. Sanya Springfield, director of the NCI Center to Reduce Cancer Health Disparities (and also, coincidentally, Adjei's mentor for his CURE K01).

"Now, with the advent of immunotherapy, we have been working...to see if we can use oncolytic viruses to enhance the efficacy of these inhibitors," he said, "and provide new therapies for treating cancer."

Adjei also discussed underrepresentation of diverse populations in clinical trials, an issue that he is passionate about.

He sees two elements to the problem. The

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***"That was a big lesson...
We need a workforce that
mirrors the population. Then
the clinical trials accrual will
follow that."***

-DR. ALEX ADJEI

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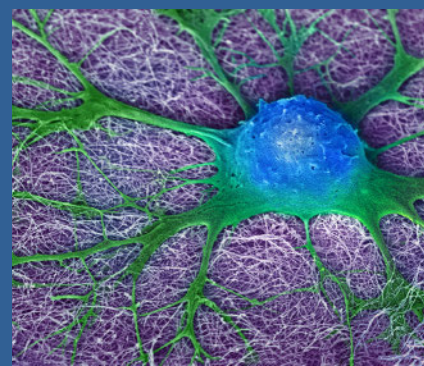
first is recruiting diverse populations to the centers conducting these trials.

"What I find is that when patients walk through the door, we can get them on study," he said.

Sharing an anecdote to highlight what he sees as the second element, Adjei explained that he was one of only two African-American fellows/faculty during

his fellowship. After leaving his fellowship, he continued to field numerous phone calls from his former African-American patients any time they were faced with an opportunity for a clinical trial, asking whether they should participate. As their former physician and as a person of color, his opinion carried weight.

"That was a big lesson," he said. "We need a workforce that mirrors the population. Then the clinical trials accrual will follow that." **R**



ON THE COVER: A mouse neural stem cell (blue and green) sits in a lab dish atop a special gel containing a mat of synthetic nanofibers (purple). The cell is growing and sending out spindly appendages called axons (green), in an attempt to reestablish connections with other nearby nerve cells. The research represents hope that one day humans may be able to reverse spinal cord damage.

IMAGE: MARK MCCLENDON, ZAIDA ALVAREZ PINTO & SAMUEL I. STUPP, NORTHWESTERN UNIVERSITY

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Klion

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Amy Klion, who gave the season's final Great Teachers version of Clinical Center Grand Rounds on June 12.

"They must do something, so why do we all have them?" said Klion, senior clinical investigator and head of the human eosinophil section of NIAID's Laboratory of Parasitic Diseases.

Like the hosts within which they reside, eosinophils can be troublemakers or help-mates. When they break bad, "they really are packets of destruction," said Klion. They can recruit cytokines, chemokines and other inflammatory cells, leading to fibrogenesis (growth of excess fibrous connective tissue) and hypercoagulability of the blood, among other problems.

"They do something good, too," added Klion, who described studies primarily in mice over the past 5-10 years showing that eosinophils play a role in glucose metabolism, regulation of gut immunity, tissue remodeling and tumor surveillance, among other talents.

Her laboratory is translational, examining the genetic and immunologic drivers of what is known as hypereosinophilic syndrome (HES) with the goal of treating patients. Unfortunately, "almost nothing is approved for eosinophilic disorders," Klion said.

HES is diagnosed when eosinophils exceed a count of 1,500/mm³ in at least two samples. It can be caused by parasites, viral infection, even cancer. In patients with eosinophilic esophagitis, food is the likely allergen.

HES results in organ damage, most commonly to the skin, but can also have pulmonary, gastrointestinal, neurologic and rheumatologic effects.

Klion has spent the last 20 years studying clinical subtypes of HES and has seen more than 500 patients with the disease at the CC during that time. Because the treatment for each subtype is different, it is important to know whether the syndrome arises from a myeloid disorder, or is lymphocyte-driven, or if it is familial, parasitic or idiopathic in nature.

"You wouldn't use steroids if a parasite



"There is absolutely room for more new kids on the block," said Klion, referring to drugs that can successfully treat HES.

PHOTOS: DEBBIE ACCAME

Bilusic Named Distinguished Clinical Teacher

NCI's Dr. Marijo Bilusic was presented with the 2019 Distinguished Clinical Teacher Award at the start of the Contemporary Clinical Medicine: Great Teachers edition of Clinical Center Grand Rounds featuring Dr. Amy Klion.

The DCTA award is the highest honor bestowed on an NIH senior clinician, staff clinician or tenure-track clinical investigator by the NIH clinical fellows. Given annually since 1985, the award recognizes excellence as a mentor and teacher and contributions to clinical research.

Bilusic directs the NIH Hematology Oncology Fellowship, which provides fellows with a grounding in clinical,

laboratory and translational research. An associate research physician in NCI's Genitourinary Malignancies Branch, he received his M.D. degree from the University of Zagreb School of Medicine in Croatia and completed his Ph.D. training at the University of Split School of Medicine, also in Croatia.

Bilusic won an NIH Director's Award in 2017 for his work merging NCI's medical oncology fellowship and NHLBI's hematology fellowship into the joint NIH entity that he now directs.



Dr. Marijo Bilusic (third from l) accepts the 2019 Distinguished Clinical Teacher Award in the company of (from l) Dr. Robert Lembo, director of the Office of Clinical Research Training and Medical Education; Dr. Peter DeMaria, co-chair of the NIH clinical fellows committee; and Dr. Jessica Zolton, reproductive endocrinology and infertility fellow and a graduate medical education committee representative.

PHOTO: DEBBIE ACCAME

[such as the *Loa loa* worm] was causing the disease," she said.

Conventional therapy for HES has been unsatisfactory, Klion reported, and includes prednisone, hydroxyurea, interferon and the enzyme inhibitor imatinib, which can be curative, but only in a small subset of patients.

"These are chronic diseases, and most people quit therapy eventually due to toxicity," she said.

It was easy to appreciate how Klion earned Great Teacher status as she clearly explained decades worth of detective work, parsing out biomarkers that identify HES subtypes, and which targeted therapies (among them imatinib, reslizumab, mepolizumab and benralizumab) seem effective as treatment.

Several of the antibodies target interleukin-5, a cytokine that Klion has found to be important at every stage of an eosinophil's career.

There still need to be more drugs, she insisted, showing slides of a female patient who dramatically improved after treatment with benralizumab. "There is absolutely room for more new kids on the block."

Interestingly, drugs that remove eosinophils don't seem to harm patients, Klion said. Though acknowledging that eosinophils have a good side to them, Klion says it appears that they can be happily lived without.

She concluded by underscoring the need for clinicians to know which clinical subtype of HES they are dealing with, because it drives the selection of therapy.

During a brief Q&A, Klion explained that eosinophils are thought to be part of a person's innate immune system, but likely in some sort of redundant role. As a member of the Laboratory of Parasitic Diseases since 1997 (and a fellow in LPD from 1989 to 1991), she has learned at least one thing:

"If you make the eosinophils go away, the patient gets better." **B**



NICHD Scientific Director Honored

Dr. Constantine Stratakis, NICHD scientific director, was recently awarded honorary membership in the Hellenic Endocrine Society at an event in Athens, Greece. The society, founded in 1964 to promote the study and profession of endocrinology, advocates for the training of endocrinologists, organizes scientific events and publishes a scientific journal in the Greek language. Stratakis—a pediatrician, medical geneticist and endocrinologist—studies the genetic etiologies of endocrine neoplasias. He is recognized for the identification and characterization of the gene for Carney complex and primary pigmented nodular adrenocortical disease. More recently, his NIH lab has identified an entire class of disorders associated with bilateral adrenocortical hyperplasias and the genetic defects associated with the Carney-Stratakis syndrome, involving heritable paragangliomas and gastrointestinal stromal tumor syndrome.

NINR Launches Symptom Science Center at Event in Masur

More than 300 people recently gathered in Masur Auditorium, while nearly 400 joined online, for the launch of the NINR-led Symptom Science Center, a trans-NIH interdisciplinary resource for precision health. The center is positioned to build the capacity for complex symptom cluster analysis and ultimately improve the lives of patients. The center will make it easier for the broader research community to tap into symptom science research and ultimately change the trajectory of chronic illness.



On hand at the event were (from l) NINR acting director Dr. Ann Cashion, NINR director emeritus Dr. Patricia Grady, Dr. Joan Austin of Indiana University School of Nursing and NINR deputy scientific director Dr. Jessica Gill.

PRECISION
HEALTH

Acting NINR director Dr. Ann Cashion began the day by reflecting how precision health is a core value of nursing and added that the new center will offer training opportunities for those interested in symptom science research. Keynote speaker Dr. Michael Gottesman, NIH deputy director for intramural research, summed up the

importance of the center: "Through the better understanding and management of the symptoms of illness—pain, fatigue, depression and the like—NINR is poised to lead NIH in its path towards precision health."

The center fits the model of bench-to-bedside and back again, a scheme that is central to nursing science. Dr. Jessica Gill, NINR deputy scientific director, noted that the goal of the Symptom Science Center is to provide a platform to promote discovery to inform the development of personalized approaches to manage symptoms across the lifespan.

The center's first protocol focusing on fatigue will be led by NINR's Dr. Leorey Saligan, acting chief of the center. He discussed the center's evolution and the need for strong collaboration between intramural and extramural communities and an overall concentration on team science.

The team-science concept was discussed throughout the day with panels on cancer-related symptoms, patient-reported outcomes and symptom clusters in concussions.

Nearly 40 symptom science researchers also presented their work during a scientific poster session. One of the highlights of the event was the presentation by NINR director emeritus Dr. Patricia Grady of the inaugural NINR Symptom Science Center Excellence Award to Dr. Joan Austin. The award recognized her sustained and significant role in developing and refining NINR's Division of Intramural Research programs.

View the symposium video (<https://www.youtube.com/watch?v=GUZUxP2TNwQ>) to learn more about the new center. —Adrienne Burroughs



Alexis Franks, an NINR postbaccalaureate IRTA fellow, presents a poster at the Symptom Science Center symposium's poster session.

PHOTOS: MENA BRUNETTE

Shendure

CONTINUED FROM PAGE 1

intramural program of NIH.”

Also former chief of NHGRI’s Cancer Genetics Branch, Trent “infused genetics and genomics into the culture of the campus science community” and his influence eventually spread to research enterprises globally, Kastner recalled. “It became a powerhouse of genetics and genomics not only in the United States but around the world.”

In his 50-minute lecture, “New Frontiers in Genomics,” Shendure briefed the audience on three starkly different projects—all funded by NIH—in which his technology development lab is “trying to answer old questions with new methods. But a common theme is this idea of multiplexing biology.”

It’s been established for several decades now that having genetic variation in the BRCA1 gene can put a person at greater risk of developing cancer; people can be readily tested to see whether they carry such variants. What still puzzles scientists, however, is that not all genetic variants in BRCA1 and related genes increase risk of cancer. How can we better distinguish the benign variants versus those that will require treatment?

“The challenge is that even though we have implicated the gene, we do not always know which variants are pathogenic,” Shendure explained.

He described how his colleagues developed a CRISPR-driven saturation genome editing method to systematically test more than 96 percent of all possible variants within key regions of the BRCA1 gene. When compared to the widely used ClinVar database of classified variants in actual cancer patients, the Shendure group results matched well for accuracy.

“We see very strong agreement between our data and those calls,” Shendure said. “We’re hoping that this is a paradigm potentially moving forward, if we can scale this further.”

For the second project, he asked a completely different question: How do we identify what genes an enhancer regulates?

Scientists commonly use expression quantitative trait locus (eQTL) studies to determine which genes an enhancer regulates. But this method is time-consuming, expensive and has other important limitations.



NHGRI scientific director Dr. Dan Kastner (l) and NHGRI director Dr. Eric Green (r) greet Shendure.

PHOTOS: ERNESTO DEL AGUILA

Inspired by this technique but seeking a more general solution, Shendure’s group designed “crisprQTL mapping, which enables testing of many candidate enhancers against many transcripts.”

Describing a third project in fewer than 10 minutes, rock star researcher Shendure—who is also a member of the advisory committee to the NIH director and had just spent the previous day and a half attending the ACD’s biannual meeting—talked about how to merge what scientists have learned about organism genomes with data from genome-wide association studies (GWAS) in humans.

In the past 5 years or so, Shendure and collaborators developed a technique—single cell combinatorial indexing (sci, pronounced “sky”)—to profile the molecular contents of large numbers of single cells without ever isolating single cells.

Since then, various colleagues have adapted sci and used the method to make, for example, an atlas transcriptome of the *C. elegans* worm and, in the space of about a week and a half, profile 2 million cells from mouse embryos in one experiment.

“The stuff you can see around development of all the various cell lineages of the organism—we’ve only scratched the surface of what we could potentially look at with these data,” Shendure said.

His group then placed a sci-derived mouse atlas on top of GWAS data to try to discern what cell types underlie common human diseases and conditions such as gout,

emphysema, systolic blood pressure and pain on walking.

“We are related,” he said wryly, showing strong matches of his group’s results with those on file in the UK BioBank. “And you can just lift the coordinates over [from the mouse genome to the human] and it works, amazingly.”

“This is giving you a glimpse of these multiplex methods,” he concluded, “that still have a lot of runway in terms of how we can apply them to contemporary and important questions in genomics and biology in general.” **R**

Nominations Open for Disability Employment Awareness Awards

In October, NIH will observe National Disability Employment Awareness Month, which celebrates workers with disabilities both past and present and emphasizes the importance of inclusive policies and practices to ensure that all Americans who want to work can work and have access to services and support to enable them to do so.

The Office of Equity, Diversity and Inclusion is seeking nominations for the Disability Champion Award and Disability Ally Award. These individuals should be exemplary in advancing the disability community in research or making NIH a more welcoming environment. The awards are open to all NIH employees and fellows.

Nominations should be made to the disability engagement committee no later than Friday, Sept. 6 by visiting edi.nih.gov.

Awardees will be honored during the first annual EDI Cultivating Inclusion: Honoring NIH Champions and Allies of Disability award ceremony on Oct. 24.



Former patient Tom Kaminski visits a patient room at left and meets with Clinical Center deputy director for clinical care Dr. David Henderson at right.

PHOTOS: MENA BRUNETTE

Grateful Patient Returns to NIH After 50 Years

In 1969, when Tom Kaminski was 7 years old, he had what doctors simply described as a hole in his heart. Officially, it was a congenital heart defect known as tetralogy of Fallot, which caused oxygen-poor blood to flow through his body and turn his lips and fingernails blue. But for Tom—a fragile, underweight kid unable to run, bike or play ball—the details of his diagnosis were the least of his concerns. The only thing he wanted was to be like the rest of the children in his New Jersey neighborhood.

Then in July—on the same day Apollo 11 launched its dramatic mission to the moon—Kaminski got his wish.

In a state-of-the-art surgical room of the Clinical Center, where Kaminski's parents had brought him in desperation, renowned

cardiac surgeon Dr. Andrew “Glenn” Morrow successfully repaired Tom’s damaged heart. Less than a week later, Morrow sent the youngster on his way, confidently predicting in his medical notes that the boy would

I am so grateful,” he told a half-dozen or so NIH staffers who welcomed him back.

It was an emotional visit not just for the 57-year-old Kaminski, now a veteran helicopter traffic reporter for WCBS 880 radio in New York City, but also for doctors and researchers at the National Heart, Lung, and Blood Institute who gathered to hear his story. “We’re thrilled to have you here,” said Dr. Gail Pearson, associate director of NHLBI’s Division of Cardiovascular Sciences. “You are a reminder of why we do what we do every day.”

Kaminski’s visit was part tour—Dr. David Henderson, deputy director for clinical care at the CC, led the way, noting some of the profound ways the center has changed in 50 years, especially for children. It was part testimonial—Kaminski offered up his story to NIH museum designer Hank Grasso for the NIH patient archives. And it was part tutorial, as Pearson and other scien-

★ ★ ★

“This place gave me a new beginning, and I am so grateful.”

—TOM KAMINSKI

★ ★ ★

“derive good benefit” from the complex surgery he’d just done.

Last month, on the 50th anniversary of that milestone day, Kaminski was back at NIH, this time with his wife and son, to prove he not only got “good benefit,” but to say thanks for the gift of a healthy life.


“This place gave me a new beginning, and

tists and researchers shared some of the head-spinning progress that has been made in pediatric cardiac care over the decades.

“We’re doing a much better job of keeping infants alive—and thriving,” said Pearson, who also is director of NHLBI’s Adult and Pediatric Cardiac Research Program. Today, NHLBI awards some \$122 million annually in research grants to help boost these kinds of efforts and learn even more about congenital heart diseases and how to treat them. That support has helped fuel a five-fold decline in congenital heart disease-related infant deaths since the 1940s.

Kaminski told the group he was just happy to be the beneficiary of the skills of the “awesome” NIH doctors and staff he insists saved his life and made him “normal.”

“It was like somebody opened up a door and said, ‘Okay, there’s the world you couldn’t be part of—go out there and be a part of it!’” he said.

To read more about Kaminski’s story, visit <https://www.nhlbi.nih.gov/news/2019/coming-home-former-patient-marks-50th-anniversary-his-surgery-nih>. 



The Kaminsky family stands with NHLBI doctors and researchers after sharing the story of Tom’s surgery at NIH in 1969. Shown are (from l) Dr. Laura Olivieri; Dr. Douglas Rosing; Lyn, Tom and J.T. Kaminski; Dr. Gail Pearson; and Dr. Richard Childs.

Pride

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Enrichment Program (NAEP) that she and Dr. Shauna Clark started. It was designed to bring under its wings gifted trainees from marginalized communities. Bali White, a prominent product of the NAEP and now strategist for the sexual & gender minority (SGM) portfolio in the Office of Equity, Diversity and Inclusion (EDI), opened NIH's Pride in Diversity 2019 SGM Community & Ally Leader Awards Program held June 20 in balcony C of the Natcher Conference Center.

"The honest truth is that many LGBT youth are still bullied and the data on attempted suicide, suicide ideation, actual suicide and homelessness in the LGBT young community is staggeringly painful," Milgram said. Her mission as OITE director is to assure that trainees from different backgrounds feel comfortable and included while pursuing research at NIH. Along with



Danny Dickerson and Dr. Rashada Alexander speak at NIH's recent Pride in Diversity event.

PHOTOS: LESLIE KOSSOFF



She underscored what many early-career researchers feel about science: that it is not a healthy place to be; that there is discrimination based on gender, color and, of course, sexual orientation.

"Lots of women tell stories about harassment in science, and I have my own," Milgram said. "We're always saying 'well,

This year's Pride program honored change agents. "These are everyday folks who are doing small things that have significant impact," said Dr. Rashada Alexander, member of EDI's SGM engagement committee. "Their presence gives shape to the environment in which we work. They are the risk-takers and visionaries who see possibilities when the rest of us sometimes see obstacles."

Receiving awards were:

- Tricia Coffey, chief of hospital information management at the Clinical Center, for her work in creating a more inclusive and diverse patient experience in the SGM community.

- Dr. Christopher Wheldon, cancer prevention fellow at NCI, for studying the unique health issues in SGM communities and for his interventions to enhance quality of life and health outcomes in these populations.

- Dr. Karen Parker, director of NIH's Sexual & Gender Minority Research Office, for the support she provides to researchers involved in working on SGM issues.

- Gabriela Zabala-Aleman, detailee at OITE, for advocacy and mentorship in the SGM community.

- Dr. Vivian Ota Wang, deputy director of NCI's Office of Data Sharing, for her research and expertise in race, sex and gender issues.

- Dr. Victoria Cargill, former associate director for interdisciplinary research at the Office of Research on Women's Health, for her contributions while she was at NIH.

"I think it's a good way for us to live, to take pride in who we are and our personal story," concluded Danny Dickerson, EDI's director of diversity and inclusion. **R**

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"These are everyday folks who are doing small things that have significant impact...They are the risk-takers and visionaries who see possibilities when the rest of us sometimes see obstacles."

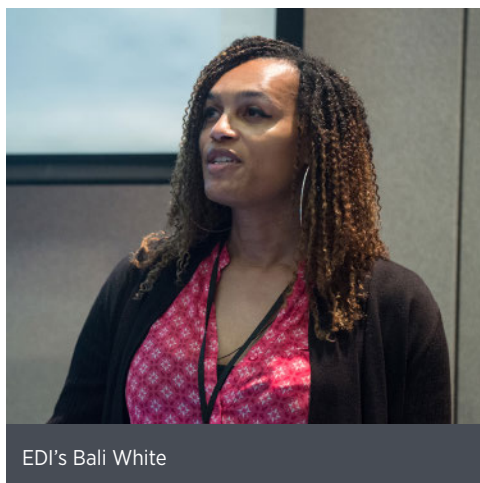
-DR. RASHADA ALEXANDER

her team, Milgram works diligently to ensure that gender and sexual orientation don't stand as roadblocks for any trainee here.

However, social acceptance of the LGBTQ community hasn't always been what it is today. This is true both inside and outside NIH. For much of her talk, Milgram told the story of her own coming out. Hailing from an Orthodox Jewish community, Milgram said it took her many years to be proud of who she is. This experience has shaped the way she handles her responsibilities as counsel for anyone having trouble assimilating in their society and workplace.

"I still come out, and I think that is one stress that can be hard for people to understand about the LGBT community—the debate of do I come out or do I not come out," Milgram said, giving an example of one of the many dilemmas facing people of this community.

we just have to persevere for the science' as opposed to 'we should be mad as hell' and do something about this." She cited a study demonstrating higher exits from STEM careers in LGBTQ people.



EDI's Bali White



IMAGE: AZGEG/GETTY

Air Pollution Tied to Newborn Intensive Care Admissions

Infants born to women exposed to high levels of air pollution in the week before delivery are more likely to be admitted to a newborn intensive care unit (NICU), suggests an analysis by researchers at NIH. Depending on the type of pollution, chances for NICU admission increased from about 4 percent to as much as 147 percent, compared to infants whose mothers did not encounter high levels of air pollution during the week before delivery. The study was led by Dr. Pauline Mendola of NICHD's Epidemiology Branch. It appears in *Annals of Epidemiology*.

"Short-term exposure to most types of air pollutants may increase the risk for NICU admission," Mendola said. "If our findings are confirmed, they suggest that pregnant women may want to consider limiting their time outdoors when air quality advisories indicate unhealthy conditions."

Previous studies have linked elevated levels of certain kinds of air pollutants to higher risks for gestational diabetes and preeclampsia, a blood pressure disorder of pregnancy. Earlier research also has shown that infants born to women exposed to high levels of air pollutants are at risk for preterm birth, of being small for their gestational age at birth and of growing more slowly than normal in the uterus. Given these associations, the study authors sought to determine whether prenatal exposure to air pollution might increase the chance for NICU admission.

Researchers analyzed data from the Consortium on Safe Labor, which compiled information on more than 223,000 births at 12 clinical sites in the United States from 2002 to 2008. They linked records from more than 27,000 NICU admissions to data modified from the Community Multiscale Air Quality Modeling System, which estimates environmental pollution concentrations in the United States. Researchers matched air quality data in the area where each birth occurred to the week before delivery, the day before delivery and the day of delivery. They then compared these time intervals to air

quality data 2 weeks before delivery and 2 weeks after delivery to identify risk of NICU admission associated with pollution levels.

Researchers do not know why exposure to air pollution might increase the chances for NICU admission. They theorize, however, that pollutants increase inflammation, leading to impaired blood vessel growth, particularly in the placenta, which supplies oxygen and nutrients to the developing fetus.

Moderate Calorie Restriction Has Health Benefits

Moderately reducing caloric intake over a period of 2 years significantly improved cardiometabolic risk factors in young and middle-age, non-obese adults, according to new findings from the Comprehensive Assessment of Long-term Effects of Reducing Intake of Energy (CALERIE) trial. The study is a multicenter randomized controlled trial supported by NIA and NIDDK.

According to the researchers, there are no pharmacologic agents with such profound effects on such a broad range of cardiometabolic risk factors. The study was published online July 11 and will appear in the September print edition of *The Lancet Diabetes & Endocrinology*.



IMAGE: INGA NIELSEN/ISTOCK

Compared to the control group, the calorie restriction group experienced significant improvements in multiple cardiometabolic risk factors, including waist circumference, blood pressure, HDL cholesterol, LDL cholesterol, triglycerides, insulin sensitivity and fasting glucose, and C-reactive protein (a marker of systemic inflammation associated with multiple chronic conditions and diseases of age).

Calorie restriction was found to improve risk factors for the development of atherosclerotic cardiovascular disease and related deaths well below clinical risk thresholds. This speaks to the impact that the dietary practice might have, even when adopted by younger people in good health.

CALERIE was the first trial that investigated the effects of 2-year caloric restriction in humans, following on evidence from several model organisms

showing that calorie restriction increased both health span and life span. More than 200 young and middle-age normal-weight or moderately overweight adults were randomly assigned to follow either a calorie-restriction diet or their usual diets. After 2 years, participants in the experimental group had reduced their daily caloric intake by 12 percent and maintained, on average, a 10 percent loss in body weight.



IMAGE: FATIHHOCA/ISTOCK

Guidelines for Introducing Solid Foods to Infants May Lead to Unhealthy Weight

Common recommendations from hospitals and infant formula manufacturers for introducing solid foods to infants could raise the risk of overfeeding or underfeeding, suggests a computer modeling study funded by NIH. The study was supported by NICHD and appears in the *American Journal of Preventative Medicine*.

Parents often seek guidance from medical professionals on how and when to first give solid foods to their infant. Many national and international organizations recommend waiting until an infant is 6 months old before introducing solid foods. However, recommendations vary significantly for infants between 6 months and 1 year. Little research evidence is available on how much solid food is appropriate during this time and what types of solid food are best.

In the current study, researchers developed a computer model that captured feeding behaviors, physical activity levels, estimated metabolism and body size of infants from 6 months to 1 year in response to guidance from Children's Hospital of Philadelphia, Johns Hopkins Medicine and baby formula manufacturers Enfamil and Similac. All of the simulated tests resulted in either overweight or underweight simulated infants by 9 months.

The researchers recommend that medical and professional organizations, government agencies and industry consider developing consistent guidelines on how best to introduce infants to solid food, including appropriate portion sizes and food types based on whether the primary feeding type is breastmilk or formula.

NIH Recognizes Project SEARCH Grads

BY DANA TALESNIK

Graduation is often emotional, the culmination of many hours of hard work. It's especially so for those with intellectual and developmental disabilities, who must often work even harder to reach this milestone.

On June 13, seven young adults graduated from Project SEARCH and celebrated with their proud families at a commencement ceremony in Lipsett Amphitheater. The program, hosted by NINDS and supported by the Ivymount School's Post-High School Program and the local nonprofit SEEC, provides education and career-based training to talented young people who have intellectual and developmental disabilities.

Maryann Sofranko, NINDS deputy executive officer, serves as NIH business lead for the program, providing daily oversight and working to arrange intern rotations with willing mentors across NIH. The graduates complete 3 10-week internships at ICs across NIH to prepare them for competitive employment. Four of the interns already have NIH job offers.

"Project SEARCH exemplifies how a workplace exercises inclusivity and diversity in a way that fosters our understanding about how important differences can be," said Dr. Maureen Gormley, deputy director for management at NINDS, who brought the program to NIH 9 years ago while serving as chief operating officer at the Clinical Center.

Gormley reflected on how each year's Project SEARCH interns brought positivity and collegiality to their office communities.

"It has really made a difference in the friendliness, in the culture of our campus," said Gormley. Looking at the interns, she commented, "You guys perpetuated that spirit of openness and human kindness, and that's one of the magical elements, in addition to all your hard work, that you've added to our organization."



At the commencement program (from l) keynote speaker Jillian Copeland offers advice, 2013 Project SEARCH graduate James Garcia sings *What a Wonderful World* and Class of 2017 graduate Zachary Sweet provides inspiration.



Project SEARCH graduates pose with instructors and staff (from l): Meghan Dworschak, instructor; graduate Douglas Morales; Lu Merrick, education partner, Ivymount School; graduate Makala Singleton-Black; Maryann Sofranko, Project SEARCH NIH business lead; graduates Jonathan Feifer and Marina Callear; Nancy Eaby, assistant director, SEEC; graduate Natalie Haynes; D'Vonte Putney, NINDS Project SEARCH team; graduates Conrad Richardson and William Schott; and Te'Keisha Coates, instructor.

PHOTOS: MARLEEN VAN DEN NESTE

This year's grads interned at offices in the Clinical Center, NINDS, NCI, NIAMS, NEI, ORS and Eures Dining Services. Their many duties included working in IT, producing videos, scanning flyers, entering and organizing data and delivering mail. Next year, for the program's 10th anniversary, the program aims to have at least one worker at every IC.

Class of 2017 graduate Zachary Sweet, who did his internship with NINDS, offered the audience an inspirational message.

"Look where I am now! I became an FTE a year after graduating from Project SEARCH," said Sweet, who now works in the institute's Information Resources Management Branch. "My journey from intern to post-hire required me to stay strong, give it my all, face challenges and overcome obstacles."

To the 2019 graduates, Sweet said, "We can work together to prove that having a disability does not mean...we are not worthy of full-time employment."

This year, four of the grads are already on their way. NCI selected Makala Singleton-Black and William Schott for provisional employment, said Sandra Thomas, deputy director of NCI's Office of Workforce Planning and Development, which will employ them. They'll gain valuable experience during their 2-year post, she said, with the potential for permanent placement. Natalie Haynes was hired by NEI and NINDS has plans to hire Douglas Morales before the end of the summer.

Keynote speaker Jillian Copeland provided some useful advice for graduates as they begin to navigate the next chapter of their lives. Everyone has fears, she said, from meeting new people to starting a new job. When she's feeling anxious, she takes a series of breaths and visualizes something positive.

"If you have fear, find what works to help you through but don't let it stop you. Find a way to get through it and push through," said Copeland, founder and board chair of the Diener School, a local, private kindergarten through grade 6 school for people with learning disabilities. She's also co-founder of Main Street Connect, a new inclusive residential development that designates a quarter of its apartments to people with disabilities.

Don't be afraid to ask for help, Copeland added. Surround yourself with supportive people, she advised, and be an important part of the team by supporting others.

"Create a positive environment everywhere you go," she concluded.

The program ended with a heart-rending performance by 2013 Project SEARCH graduate James Garcia, who now works in ORS. He sang *What a Wonderful World*.



PECASE honorees include (from l) Dr. John Brognard, Dr. Romina Goldszmid, Dr. Christopher Hourigan, Dr. Chandra L. Jackson and Dr. Jennifer Martinez.

PECASE Honors Nine NIH'ers

Nine NIH'ers were recently named recipients of the Presidential Early-Career Award for Scientists and Engineers (PECASE). PECASE is the highest honor given by the U.S. government to outstanding scientists and engineers who are beginning their independent research careers and who show exceptional promise for leadership in science and technology. The NIH awardees are:

Dr. John Brognard, NIH Earl Stadtman investigator and head of the signaling networks in cancer section of the Laboratory of Cell and Developmental Signaling in NCI's Advanced Technology Research Facility

Dr. Romina Goldszmid, Earl Stadtman investigator and head of the inflammatory cell dynamics section in the Cancer and Inflammation Program of NCI's Center for Cancer Research

Dr. Christopher Hourigan, chief of NHLBI's Laboratory of Myeloid Malignancies, which studies measurable residual disease in acute myeloid leukemia

Dr. Chandra L. Jackson, Earl Stadtman investigator, Social and Environmental Determinants of Health Equity Epidemiology Branch, NIEHS and NIMHD

Dr. Jennifer Martinez, tenure-track investigator, NIEHS inflammation and autoimmunity group

Dr. Katherine McJunkin, Stadtman tenure-track investigator and acting chief, section on regulatory RNAs in NIDDK's Laboratory of Cellular and Developmental Biology

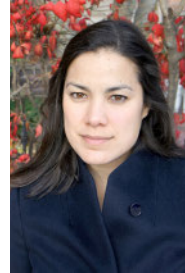
Dr. Adam Phillippy, principal investigator, NHGRI genome informatics section

Dr. Anish Thomas, investigator and Lasker clinical research scholar, Developmental Therapeutics Branch in NCI's Center for Cancer Research

Dr. Catherine Weisz, investigator and acting chief of NIDCD's section on neuronal circuitry.

PECASE was established in 1996 and recognizes contributions scientists and engineers have made to the advancement of science, technology, education and mathematics education and to community service as demonstrated through scientific leadership, public education and community outreach. The White House Office of Science and Technology Policy coordinates PECASE with participating departments and agencies.

In addition to the scientists in NIH's Intramural Research Program, dozens of grantees in at least 18 states received PECASE recognition.



Dr. Katherine McJunkin



Dr. Adam Phillippy



Dr. Anish Thomas



Dr. Catherine Weisz

Have Pentalogy of Cantrell?

NHLBI seeks patients with pentalogy of Cantrell and their family members to join a study. Doctors want to learn if there is a genetic cause of this rare disorder. You will have a sample (usually saliva) collected for genetic testing and whole exome sequencing and a review of your medical records. There is no charge for study-related tests. Travel to NIH is not required. For more information, call 1-866-444-2214 (TTY 1-866-411-1010). Visit Clinicaltrials.gov and refer to study 04-H-0202.

VRC Recruits Healthy Volunteers

Vaccine Research Center researchers seek healthy volunteers, 18-50 years old, for a study evaluating an investigational vaccine that targets HIV. Compensation is provided. There is no risk of infection. To learn how to participate, call 1-866-833-5433, email vaccines@nih.gov or visit <http://bit.ly/VRC-018>.

Patients with Fanconi Anemia Needed

NHLBI researchers need volunteers at least 4 years old with Fanconi anemia to participate in a study investigating a treatment to improve blood counts. Compensation for travel is provided. Study-related tests are provided at no cost and results are shared with you and your doctor. Call 1-866-444-2214 (TTY 1-866-411-1010). Read more at <https://go.usa.gov/xQyKp>. Refer to study 17-H-0121. Se habla Español.

Volunteers with Leukemia Sought

NHLBI researchers need volunteers with CLL (chronic lymphocytic leukemia) or small lymphocytic lymphoma (SLL) for a new investigational treatment study. Researchers are adding pembrolizumab (an immunotherapy agent) to standard treatment. If you have received treatment for CLL and progressed or have high-risk genetic changes such as deletion 17p, TP53 mutation, NOTCH1 mutation or complex cytogenetics, you may be interested in participating. To learn more, call 1-866-444-2214 (TTY 1-866-411-1010). Read more online at <https://go.usa.gov/xnYae>. Refer to study 17-H-0118.

Study Needs Healthy Volunteers

NINDS researchers seek healthy volunteers for an outpatient research study. The purpose of this study is to understand more about how the brain controls motor function. Volunteers may receive brain, skin and nerve stimulation and may perform tests of hand movement, behavior and learning (some tests may be done during an MRI scan of the brain). Volunteers may be scheduled for between 1-20 sessions. Sessions will be of various durations, lasting up to 8 hours each. There is no cost for research-related procedures or participation. Compensation is provided. For more information, call 1-866-444-2214 (TTY users call via MD Relay 7-1-1) or email prpl@cc.nih.gov. Refer to study 07-N-0122. Read more at <https://go.usa.gov/xPRWT>.

NINDS Program Helps STEM Students Navigate Neuroscience

BY SHANNON E. GARNETT

For high school science students, imagining an actual career in science may seem like a far-off dream. But one NINDS program is working to make that dream a reality. The NINDS Girls Navigating Neuroscience program helps female STEM students develop and nurture their excitement about science while at the same time showing them that science can be accessible and fun.

NINDS recently hosted more than 35 female STEM students from three Prince George's County public high schools—Charles H. Flowers, Eleanor Roosevelt and Oxon Hill—for a day of scientific presentations, career advice, laboratory tours and hands-on activities.

The year-long program, part of a partnership between the NINDS Office of Programs to Enhance Neuroscience (OPEN) Workforce Diversity, Young Women in Bio and PGCPs, consists of 4 events (3 of which took place earlier in the year at the schools) and strives to get diverse female STEM students interested in careers in science, specifically neuroscience. The long-term goals are to encourage students to apply for the NIH Summer Internship Program and to help develop a diverse biomedical research workforce for the future.

After a welcome by Dr. Rita Devine, assistant director of science administration in the NINDS Division of Intramural Research, and Dr. Angel de la Cruz Landrau, coordinator of the Summer Internships, Diversity and Postbacs Program in the office of NINDS's scientific director, the students heard a talk from NIH Academy director Dr. Shauna Clark.

As an undergraduate on a full scholarship at Texas A&M, Clark majored in biochemistry and earned spending money by taking part in the work-study program—working in 3 different laboratories along the way. “My interest in doing research blossomed as an undergrad when I worked in the labs with different people on different projects,” Clark said.



NINDS recently welcomed more than 35 female Prince George's County Public School STEM students at the Girls Navigating Neuroscience program.

PHOTOS: CHIA-CHI CHARLIE CHANG



At left, STEM students get an opportunity to see and use many different types of lab equipment. At right, the program included tours of NIH labs in Bldgs. 35, 49 and 10 during which the young women were encouraged to perform hands-on activities.



“And I discovered that I really liked lab work.”

Clark went on to earn a bachelor of science degree and then to pursue a Ph.D. in infectious diseases and microbiology from the Graduate School of Public Health at the University of Pittsburgh, where her work focused on HIV drug resistance. The experience provided her with an interesting and well-rounded education because it mixed public health with lab work. She came to NIH as a postdoc working on hepatitis C research.

Eventually, she also got involved in mentoring and found she liked it even better than lab work. Clark now teaches about health disparities at the NIH Academy. “As you move through your career, you'll keep evaluating and reassessing what's important to you,” she explained.

Students were then divided into small groups—each led by an NINDS volunteer—and toured labs in Bldgs. 35, 49 and 10.

During the tours, students were given a brief overview of each lab and its focus and allowed to perform a hands-on activity.

In one lab studying the visual system of the fruit fly, students were able to look at different types of live flies—white-eye, red-eye, straight-wing and curly-wing—through a dissecting microscope.

In other labs, students learned about neuronal electrophysiology—the study of electrical properties of cells and tissues within the nervous system, DNA amplification and analysis and NINDS's current research on disorders such as hereditary spastic paraplegia and muscular dystrophy.

Students also got to see and use many different types of lab equipment including DNA sequencing and cryostat machines and a microscopy room



NINDS postbac Ashley Williams shares her career journey during the student panel.

where they were able to view images of brain cells.

As the young women assembled after lunch, they were greeted by NINDS scientific director Dr. Lorna Role.

“I hope you stay with it [science],” she said. “The sooner you start and the sooner you get into it, the more likely you are to stay with it. It's an incredible trip to be a scientist.”

Final events included a student panel featuring two NINDS postbacs—Melanie Delgado and Ashley Williams—and a presentation from Dr. Edjah Nduom, an NINDS neurosurgeon-oncologist.

Delgado and Williams each shared how their early interest in science developed through the years and how they took advantage of different opportunities in high school and college to nurture those interests—which eventually led them to their present-day careers here. The young scientists also provided advice on how to pursue science careers. Key messages included the importance of networking, creating and sharing your story and being persistent. Informal sessions followed each presentation during which students were encouraged to ask for career advice or about current research projects.

In addition to Nduom's ever-popular brain surgery videos, he shared how he started out pursuing physics and ended up as a neurosurgeon conducting research. “Some of it was luck,” he said of his career journey. “A lot of it was opportunity and a lot of it was perseverance.” **R**