

ANNUAL 'AVALANCHE' ACTIVITY 31st Research Festival Celebrates Science, People Who Do It

BY CARLA GARNETT

The first talk in the first plenary session of this year's NIH Research Festival provided a perfect metaphor for the annual event.

Discussing his discovery of “neuronal avalanches” that occur in brain activity, Dr. Dietmar Plenz noted that one of neuroscience’s loftiest goals is to understand the dynamics of these amazing onslaughts of activity—these downpours in the gray matter—how they are organized and how they can be quantified and measured.

“The complexity is incredibly high,” said



NIH deputy director for intramural research Dr. Michael Gottesman enjoys a poster session with fellow presenter Dr. Kandice Tanner of the National Cancer Institute.

Plenz, principal investigator in NIMH’s section on critical brain dynamics. “In order to understand neural dynamics, we have to reconstruct each element. We have to

understand its connection statistics and we have to understand how activity propagates along those [brain cell] branches and that is truly a very complex challenge...We decided years ago that maybe we can’t reconstruct how each individual neuron fires, but maybe we can pick up how neurons who are neighbors fire together.”

NIH’s annual “avalanche” of science can be described in similar terms: For 3 days, the event heroically attempts to capture and present for a wide audience the breadth and complexity of research interaction that happens here on a daily basis. For a brief time, attendees can witness how scientific neighbors fire together.

“The Research Festival is about the science we do here, but also about the people who do that science,” noted NIH deputy director for intramural research Dr. Michael Gottesman, opening this year’s

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TEAM EFFORT

Undiagnosed Diseases Program Seeks to Solve Medical Mysteries

BY ERIC BOCK



Dr. William Gahl

When patients can’t get a diagnosis, they turn to Dr. William Gahl, head of the Undiagnosed Diseases Program (UDP) and clinical director at NHGRI.

“Our goal is to lend a hand to these individuals who don’t have a diagnosis to

go on. A diagnosis is often a precursor to treatment,” said Gahl during an Aug. 3 lecture for summer students titled “The NIH Undiagnosed Diseases Program and

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56 YEARS LATER

NIAID Scientists Find Gene Behind Colleague’s Eponymous Syndrome

BY JUDITH LAVELLE

“There is real value in experimental odysseys,” says Dr. Thomas Waldmann of the National Cancer Institute.

The NIH distinguished investigator celebrated a new leg of one such journey this summer. In June, colleague Dr. Michael Lenardo, an investigator at the National Institute of Allergy and Infectious Diseases, published his finding of a genetic cause and potential treatment for a subset of the gastrointestinal disease Waldmann had discovered in 1961. Lenardo, who Waldmann recruited to NIH more than two decades ago, will join Waldmann to give a Clinical Center Grand Rounds lecture on their discoveries in Masur Auditorium, Bldg. 10 on Oct. 15.

In 1956, Waldmann came to NIH from

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Kids’ science program needs teachers. See p. 2.

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NIH Surpasses Feds Feed Families Goal

Each year, NIH has managed to reach its Feds Feed Families goal, collecting non-perishable goods to benefit local food banks, NIH patients and their families.

This year, employee support was beyond anything witnessed before. With a goal of 31,000 lbs., NIH exceeded the mark by an astounding 59,000 lbs., collecting almost 91,000 lbs. The generosity has a direct benefit to the Capital Area Food Bank, the Children's Inn, the Safra Lodge and food banks in Frederick, Baltimore, Arizona, North Carolina and Montana. Due to the overwhelming success, NIH even extended support to victims of Hurricane Harvey, with a donation to the San Antonio Food Bank.

"Employee dedication and participation was beyond anything we've seen in the past," said Timothy Tosten, acting director, Office of Research Services and the Feds Feed Families campaign chairperson. "Through increased awareness, IC events such as hosting contests, socials and the Food Fight Challenges, enthusiasm was at an all-time high."

Donations included:

- 17,538 lbs. of non-perishable goods donated to the Capital Area Food Bank, the Children's Inn and the Safra Family Lodge



Allison Bloss (l) and Shrylnee Speed from the Office of Research Services at a campaign information table

- \$5,662 of vouchers purchased through the "Fighting Hunger" food vouchers at Eurest cafeteria check-out lines—all voucher proceeds will be donated to the San Antonio Food Bank to assist families affected by Hurricane Harvey (56,620 lbs. of food to be donated)

- 6,424 lbs. collected and donated by Frederick and Baltimore, as well as Arizona, North Carolina and Montana NIH offices

- 9,657 lbs. donated through the Capital Area Food Bank's online giving

Shrylnee Speed, program coordinator, thanked the "incredible efforts" of volunteer staff, who "enthusiastically helped with sorting, weighing and packing the collected food. I was awestruck to see the amazing work NIH does to help those in need."



Above, Donna Siegle, NCI acting executive officer, represents this year's Food Fight Challenge winner. Below is NHGRI's winner in the collection box decorating contest.



Science Program for Kids Needs Teachers

Adventure in Science (AIS), a non-profit science education program for children, is planning its 25th year at NIH. The program, which meets on Saturday mornings October through March in Bldg. 10, is designed to show 8- to 11-year-olds the fun of science using hands-on activities—from building (and launching) model rockets to dissecting frogs, visualizing the activity of enzymes, measuring their lung volumes and more.

AIS teachers are mostly volunteers from the NIH community, from postdoctoral fellows to institute directors. This is a great opportunity to exercise your teaching skills with an enthusiastic audience. You can volunteer to teach for only one Saturday or for several.

If you are interested in AIS, read the "About Us" section at www.adventureinscience.org. Then, if



you want to volunteer, think about possible topics you might teach and send your contact information to Ed Max (eemax68@gmail.com). Enrollment for children is completed for this year, but will be open for 2018-2019 next spring, as announced at www.adventureinscience.org/ais-registration.

NIBIB Mentors Venezuelan Team in Robotics Competition

BY THOMAS JOHNSON

Borrowing a tradition from the Olympic Games, the 3-day, inaugural FIRST Global Challenge robotics event got under way recently with a Parade of Nations. Competitors from more than 160 countries filed into DAR Constitution Hall in Washington, D.C., under the banners of their home countries amid cheers from an excited crowd and attentive media. The teams of college and high school students surmounted various well-publicized and lesser noted hurdles to reach the big competition.

FIRST Global is a public charity that organized the international robotics challenge to ignite passion for science, technology, engineering and mathematics—STEM—among the next generation around the world. In the first of what will be an annual meet, student teams competed with the robots they built using 2,000-piece kits provided by FIRST Global in March.

Along with shipping the robots ahead of the competition, FIRST Global also then paired each team with mentors from around the world. At NIH, the National Institute of Biomedical Imaging and Bioengineering fielded a team of remote volunteer mentors to help a student robotics team from Venezuela to design and build their robot.

NIBIB engineers, organized by Grace Peng and led by Andrew Weitz, soon became acquainted with the Venezuelans, who named their robot Venebot. The NIBIB team, which included extramural program staff and intramural scientists, provided mentorship through weekly Skype and WhatsApp meetings with the Venebot team starting in May.



Supporters of the robotics challenge include (from l) FIRST Global founder Dean Kamen, Venebot team leader Kenny Urdaneta and NIBIB director Dr. Roderic Pettigrew.

In addition to Peng and Weitz, NIBIB volunteers included Emily Conlan, Steve Zullo, Michael Wolfson and Harshad Vishwasrao.

“I am delighted by NIBIB’s engagement in this inspiring international program, which offers such a rewarding opportunity for students to develop hands-on, team engineering skills,” said NIBIB director Dr. Roderic Pettigrew, who spent time with the young competitors during the event. Team Venebot leader Kenny Urdaneta confided to Pettigrew that political unrest in Venezuela presented a number of obstacles for the team just to meet regularly, work during protests and travel to the U.S. “Despite the difficulties, these students are full of hope and are all reaching for the golden ring,” said Pettigrew. “It was a fantastic event.”

While the long-term goal of the competition is to engage students around the world in a STEM activity, the game’s immediate goal drew attention to a real-world problem in many of the participating nations—access to clean, safe drinking water. FIRST Global designed a game where the robots worked to separate “clean water” (blue balls) from “contaminated water” (orange balls). While the

teams remotely controlled the robots to deliver the blue balls to a holding pool at one corner of the arena, they also directed the robots to carry the orange balls up a ramp and toss them through a doorway, representing a contaminated water analysis laboratory. The teams earned points for successfully directing the balls to each area.

The teams were awarded gold, silver and bronze medals in several categories, some for points accumulated during the robotics competition and others for elements such as design innovation and international unity. “One of the unique qualities of the FIRST organization is how it fosters multi-team alliances that require communicating, cooperating and working together,” Peng said. “They call it ‘coopetition,’ which requires another of the organization’s goals of gracious professionalism.”

Venebot team members soaked up the excitement and enthusiasm of the event—exchanging pins, buttons and lanyards and meeting young engineering enthusiasts like themselves from every part of the world. **R**



ON THE COVER: *Enzyme repairing DNA. Like a watch wrapped around a wrist, a special enzyme encircles the double helix to repair a broken strand of DNA.*

IMAGE: TOM ELLENBERGER, WASHINGTON UNIV. SCH. OF MED. & DAVE GOHARA, SAINT LOUIS UNIV. SCH. OF MED.

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At Team NIBIB’s first in-person meeting with Venebot team members on the evening before the competition are (back row, from l) NIBIB’s Grace Peng, Emily Conlan, Andrew Weitz and Steve Zullo. Wearing yellow T-shirts are (from l) Venebot college student team leaders Javier Carroz and Urdaneta. In blue are high school Venebot team members Emanuel Andrade (l), Freddy Sarcos, foreground, and Samuel Larreal, at right alongside NIBIB advisors.

PHOTO: MEHRAN ARMAND

NIH National Institutes of Health
Turning Discovery Into Health



At left, Dr. Camilo Toro speaks with patient Kathleen R. Kelley in Lipsett Amphitheater. Above, Kelley chats with UDP head Dr. William Gahl.

PHOTOS: MARLEEN VAN DEN NESTE

Gahl

CONTINUED FROM PAGE 1

Network: Diagnosis and Discovery” in Lipsett Amphitheater.

Started in 2008, the program, he explained, “helps patients reach a diagnosis when they didn’t have a diagnosis” and “offers some insight to the biomedical research community into medicine, namely cell biology, biochemistry and physiology.”

Program applicants must submit medical records along with a letter from a referring doctor. Once an application is received, the UDP consults with medical specialists within NIH to determine whether it would be a good case to take on. The program accepts roughly 30 percent of applicants.

Those admitted visit the Clinical Center for one week, where they undergo extensive testing, generally including exome or genome sequencing. Genomic sequencing determines the complete DNA sequence while exome testing determines the 1-2 percent of the genome that contains protein-coding genes. Often, family members provide blood and tissue samples. This approach allows researchers to compare a patient’s genome with those of the healthy relatives.

“In a week, we can get testing that would often take a year or two, going back and forth as an outpatient and getting permission from insurance companies,” Gahl said.

Over the past 9 years, the program has evaluated more than 4,000 medical records and seen more than 1,000 patients. Forty

percent of patients are children and 50 percent of cases are neurologic. “We’ve made a diagnosis in about 30 percent of cases,” Gahl said. Doctors in the UDP make about half of their diagnoses because they recognize other rare diseases already described in the medical literature.

“When you make a diagnosis, you bring

★ ★ ★

“It’s a calming feeling to know what it is now. It’s not MS, so I don’t have to take that medicine.”

-KATHLEEN R. KELLEY

★ ★ ★

some measure of closure to patients who are basically questioned by their family, relatives, colleagues and, sometimes, their physicians, about whether they actually have something significant because they can’t name it,” he said.

Kathleen R. Kelley, a mother of one patient in the program, was diagnosed with multiple sclerosis (MS) in 2000. She experienced headaches, walking difficulties and other symptoms. She began taking medicine to treat the condition. It turned out, however, she didn’t have MS.

She now believes she has the same condition as her daughter: oculodentodigital dysplasia, a rare disease that affects the eyes,

teeth and hands. Symptoms include eye problems that may lead to vision loss, muscle spasms in the hands, dental problems and webbed fingers.

“It’s a calming feeling to know exactly what it is now. It’s not MS, so I don’t have to take that medicine,” she said.

Dr. Camilo Toro, a neurologist with the UDP, said the cost of MS drugs is “exorbitant.” Although many of the drugs are at least 20 years old, their prices keep rising. The medications cost around \$50,000-\$60,000 per year.

Even if there’s no treatment, getting the correct genetic diagnosis is extremely important. Patients who know what they have can inform their spouses for family planning purposes and can avoid medications that might make symptoms worse. When there’s a mistaken diagnosis, “harm can be done,” Gahl said.

Recently, NIH, via the Common Fund, launched the Undiagnosed Diseases Network, which encompasses 7 clinical sites around the country, a coordinating center and core facilities. So far, Gahl said, the network has received 1,500 applications. Of those, 400 patients have been evaluated and more than 100 have been diagnosed. The sites in the network can share patients’ personal information, including names.

“The patients allow that and actually want that, so they can find other cases and make a community of patients who have these rare, rare diseases,” Gahl noted. **B**



Dr. Patricia Grady (l) and Dr. Kate Lorig

PHOTO: NATHAN BROWN

Lorig Presents on Self-Management of Chronic Diseases

Dr. Kate Lorig recently presented the second NINR Director's Lecture of 2017. In her talk, "Chronic Disease Self-Management—Evidence, Instruments, Translation and Beyond," she discussed the effectiveness of low-cost self-management interventions for reducing symptoms and improving quality of life. She also explored the role of self-efficacy, one's belief in his or her ability to succeed in specific situations or accomplish a task, as a predictor and moderator of health outcomes.

In describing self-management, and its importance for patients, Lorig notes, "We should care because people with chronic conditions live 99 percent of the time outside of the health care system and what they do in that time largely determines their quality of life, their health and their utilization of the system."

During her decades of study, Lorig has posited that confidence means self-efficacy. In that light, she and colleagues have repeatedly found that both baseline self-efficacy and changes in self-efficacy predicted outcomes in their self-management programs.

Another important aspect of her work was translating programs from English to Spanish and studying the effects in a new study population. Interestingly, their analyses repeatedly found that native Spanish-speaking subjects had better self-rated health and less health distress.

In introductory remarks, NINR director Dr. Patricia Grady highlighted Lorig's distinctiveness, "in that she not only tests these programs, but she goes on to disseminate her findings, which have been incorporated into policies by patient advocacy organizations and on a national scale."

Lorig is professor emerita at Stanford School of Medicine. Her research has been supported by NINR as well as other NIH institutes, government agencies and foundations. Interventions developed from her work are used in more than 30 countries and have been accessed by over a million people.

The video of Lorig's lecture is now available on NINR's YouTube channel at <https://www.youtube.com/user/NINRnews>.

SINCE 1996

NCI's CURE Program Marks 21 Years

Shaping the biomedical workforce to ensure it reflects our nation's growing diversity has been at the forefront of NCI's Center to Reduce Cancer Health Disparities (CRCHD) Continuing Umbrella of Research Experiences (CURE) program efforts for more than two decades. In recognition, CRCHD is celebrating the CURE program's 21st anniversary this year.

Established in 1996, CURE is a unique holistic training and career development strategy and philosophy that provides support at every point in a career, reaching all the way back to middle school and continuing until the independent cancer researcher level. CURE provides a smooth, continuous path to a career in cancer and cancer health disparities research and has proven to be successful at building a cadre of competitive underrepresented minority cancer researchers.

CURE's pipeline approach is critically important to engaging some of the nation's most talented students—those from backgrounds typically underrepresented in research.



CURE Lifetime Achievement honorees include (from l) Dr. Miguel Villalona-Calero, Dr. Robert Winn, Dr. Annette Khaled, Dr. Manuel Penichet and Dr. Eduardo Sotomayor.

To date, CURE has supported more than 3,000 students, postdocs and early-stage investigators.

CRCHD hosted "Celebrating 21 Years of the CURE Program" recently at Natcher Conference Center to honor the work of 26 of CURE's most accomplished scholars, mentors and champions.

"CURE is an extraordinary program because of our

scholars and those who support it," said Dr. Sanya Springfield, CRCHD director. "This celebration was a way to recognize notable CURE honorees who represent the best of those who make the CURE program so special."

Honorees included investigators from the early stages of the CURE pipeline to those who have made a significant impact in the fields of cancer and cancer health disparities research over the course of their careers, as well as mentors and champions.

"The CURE program is a truly unique program where students, investigators, mentors and program directors work in collaboration, with the purpose of advancing cancer research and career development. It was a wonderful celebration," said CRCHD deputy director Dr. H. Nelson Aguila.

Also attending were about 25 special guests, the UMB CURE Scholars. This CURE-supported program identifies promising middle school students in Baltimore and prepares them for careers in health care and research through hands-on workshops, lab experiences and mentorship.

Dr. Jay Perman, president, University of Maryland, Baltimore, spoke about how CURE is influencing the UMB CURE Scholars Program.

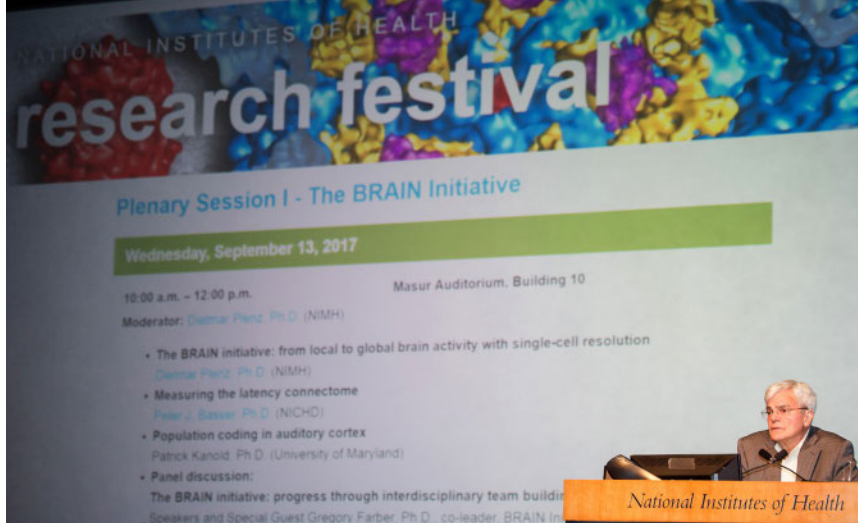
The celebration continued the next day, with the first CURE Distinguished Scholars Seminar. This semi-annual seminar series recognizes former CURE scholars who are making seminal contributions to the fields of cancer and cancer health disparities research.

The inaugural guest speaker was Dr. Lewis R. Roberts, Peter and Frances Georgeson professor in gastroenterology cancer research at the Mayo Clinic in Rochester, Minn. Roberts shared a personal account of what led him to his career in researching the mechanisms of liver and biliary carcinogenesis as well as his work with the diagnosis and treatment of hepatitis and liver cancer in immigrant African and U.S. communities.

"Dr. Roberts set a wonderful precedent for this new seminar series," said Springfield. "His passion has clearly contributed to the success of his transformative research."

To watch the celebration online, visit <https://www.cancer.gov/about-nci/organization/crchd/diversity-training/cure/honors>.

For more information about CRCHD and CURE, visit crchd.cancer.gov.



At left, NICHD's Dr. Alejandro Alvarez-Prats discusses his research during one of four poster sessions at the 2017 NIH Research Festival. At right, Gottesman opens the first plenary session in Masur Auditorium. There were three plenary sessions during this year's festival.

Festival

CONTINUED FROM PAGE 1

event on Sept. 13. The 2017 edition featured 40 talks and panels as well as 400 posters and exhibits “covering some of the hottest research at the NIH.”

The celebration of science started as a 1-day event, “Research Day,” conceived by then-National Institute of Dental Research scientific director Dr. Abner Notkins, Gottesman recalled.

“The idea was to get people out of their labs—people become very parochial around here; they’re sometimes chained to their lab benches—so they could meet other people at NIH, get some new ideas, talk about their research and hear about others’ research,” in order to spur more collaboration and interaction.

“That’s still the intent” of the festival, now expanded three times as long, he said.

“You’ll notice that most of the poster presenters are our trainees,” Gottesman continued, joking. “That’s because the trainees and the fellows who are here do most of the exciting science at the NIH...One of the most fun aspects of the festival is when we ask the scientific directors and the institute directors to present posters about their own work... This is an opportunity for them to find out what’s going on in their own laboratories.”

Scientific directors Dr. Susan Amara (NIMH) and Dr. Stephen Chanock (NCI’s Division of Cancer

Epidemiology and Genetics) cochaired this year’s event.

“Although my colleagues in other institutes might contest this, those of us who work in the field of neuroscience think that, by far and away, the brain is the coolest and most amazing organ,” Amara quipped, intro-

• • •

“The idea was to get people out of their labs...so they could meet other people at NIH, get some new ideas...”

—DR. MICHAEL GOTTESMAN

• • •

ducing the first plenary session on the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, which was announced by President Obama in 2013.

“[The initiative] addresses the ultimate grand challenge of understanding the brain,” Amara explained, “how the brain and nervous system regulate thought, action,

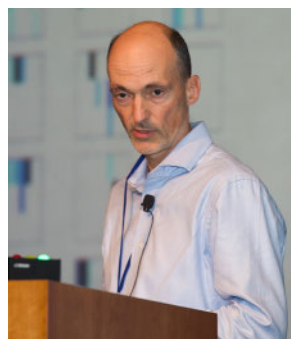
mood and sensation and how to improve and restore its function when things go awry.”

For the first time at Research Festival, in addition to NIH intramural scientists, an extramural investigator presented. BRAIN grantee Dr. Patrick Kanold of the University of Maryland gave a talk, due to the unique intra/extramural nature of the initiative.

The Fellows Award for Research Excellence (FARE) Program, in its 23rd year, kicked off festival day two. FARE recognizes outstanding research by intramural fellows working here for fewer than 5 years. Close to 800 competitors submitted entries this year; 199 received a \$1,000 travel award to present their research at a scientific meeting in the coming year. The NIH fellows committee (Felcom), institute/center scientific directors and the NIH Office of Intramural Training and Education sponsor FARE annually.

All trainees were feted with an ice cream social on the next day, when NIH leadership including NIH director Dr. Francis Collins served the cold refreshment.

Inflammatory diseases, another cross-cutting topic on the Intramural



Plenary speakers include (from l) NIMH scientific director Dr. Susan Amara, NIMH's Dr. Dietmar Plenz, BRAIN grantee Dr. Patrick Kanold and NIAMS scientific director Dr. John O'Shea.

PHOTOS: MARLEEN VAN DEN NESTE



At left, ceremony paying tribute to the role animals play in research was held outside Bldg. 10. At center, Dr. Dennis Jones of Massachusetts General Hospital, a participant in this year's Future Research Leaders Conference, describes his poster to Dr. Hannah Valentine, NIH chief officer for scientific workforce diversity, whose office sponsors the conference annually. At right, the NIH Library offered virtual reality demonstrations at several times throughout the festival.

Research Program's long-term bucket list, was the theme for the second plenary session.

"What we've learned since the turn of the century is that basically every cell is an immune cell," said NIAMS scientific director Dr. John O'Shea, moderating the plenary. "No matter what disease you're working on, you may not think of yourself as an immunologist or inflammatologist, but in fact you are. All of us here, as we're doing our work—even if we are T cell and B cell biologists or classic immunologists—we think more about how cells other than traditional immune cells impact traditional immunology—everything from microbiome acting on epithelial cells and so on. [Inflammation] is a very exciting area and now is a very exciting time to be an immunologist."

The final plenary on day three covered another White House-spurred initiative, the

Cancer Moonshot, launched by Congress via the 21st Century CURES Act in 2016.

"The goal is not only to accelerate cancer research, but also hopefully to innovate and find new avenues," said Chanock, introducing the session. "But the most important thing is to accelerate, to do what we believe could be done in 10 years in 5 years or less."

Chanock heralded the leadership of the moonshot's "driver" at NIH, Dr. Dinah Singer, senior investigator and chief of the molecular regulation section in NCI's Experimental Immunology Branch and director of the Division of Cancer Biology.

"We would not be where we are without Dinah and her initiative, her drive and her vision to be able to realize it," he said, acknowledging "the hundreds of people involved, but for the NCI portfolio, it maps back to Dinah.

"That's the key thing about the

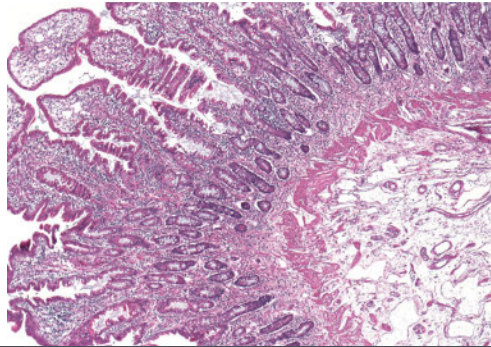
moonshot," he continued, "not only is it driving the science, but also it's making the science available, it's working in important teams in a collaborative fashion to put our collective feet on the accelerator."

Occurring at designated times throughout the 3 days, in between lectures and symposia, were virtual reality demonstrations, a Technical Sales Association tent show of scientific equipment, a Green Lab Fair highlighting the latest in sustainable tools and techniques and an animal tribute ceremony acknowledging the vital role non-human research partners play in scientific accomplishment at NIH.

Food also figured prominently in the festival, with an IC and scientific directors' bake-off held on day one during their poster session and a "Taste of Bethesda" lunch sponsored by the Recreation and Welfare Association on day two.



Scenes from the festival include (from l) the Green Lab Fair showing sustainable research techniques in the Clinical Center's south lobby, NIAID's Dr. Cheri Lee discussing her poster on the FAES Terrace and the ever-popular Taste of Bethesda lunch sponsored outdoors under tents by the R&W Association.



Drs. Thomas Waldmann (l) and Michael Lenardo worked on CHAPLE disease. At right is the gut tissue of a child with the illness. Large white areas at lower right are enlarged lymphatic vessels.

Syndrome

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Harvard Medical School and Massachusetts General Hospital, where he had received his first research grant totaling \$50. At NIH, he began research on how the body metabolizes proteins in the blood, including protective immune proteins called immunoglobulins, or antibodies. Not long after joining NCI, a personnel change put the young researcher in charge of ongoing projects at the institute's Metabolism Branch. "So I, with a total research experience of a \$50 grant, was *de facto* a tenured investigator," remembered Waldmann, who now serves as chief of the Lymphoid Malignancies Branch at NCI's Center for Cancer Research.

Taking advantage of what was then the relatively new Clinical Center, Waldmann's group began to work with patients who had unusually low levels of immunoglobulin. At the time, he recalls, most physicians believed such patients were simply not making enough immunoglobulin. While this was true for many disorders, he identified a group of patients among those with low immunoglobulin whose symptoms appeared to have a different cause.

By radiolabeling immunoglobulin in the blood, the lab discovered that some patients were losing these essential antibodies through abnormal lymphatic channels in their digestive tract. As a result, the patients developed symptoms in early childhood, were prone to infections, experienced severe intestinal distress and were not likely to survive into adulthood.

After initially describing this condition in *Gastroenterology* in 1961, Waldmann and his colleagues published a comprehensive report on the condition in the *Journal of Clinical*

Investigation in 1967. The team dubbed the disease primary intestinal lymphangiectasia, while the National Organization of Rare Disorders called it Waldmann's disease.

More than four decades later, Lenardo, chief of the molecular development of the immune system section in NIAID's Laboratory of Immunology, encountered a similar set of children through his collaborators in Turkey. Like Waldmann's patients, they had low levels of protective antibodies,

account for the symptoms experienced by patients suffering an ailment they dubbed CHAPLE disease, or CD55 deficiency with hyperactivation of complement, angiopathic thrombosis and protein-losing enteropathy.

This investigation could not have been imagined in the 1960s, but is now possible due to advances in genetics research. "When new techniques, new approaches, new people look back at the same subset of patients," said Waldmann, "new discoveries are made."

Remarkably, Lenardo and his colleagues not only defined a genetic cause for CHAPLE disease but also identified a potential treatment for the disorder, which previously had no specific therapy.

As soon as they understood the mechanism behind the disease, Lenardo's team got to work testing drugs already approved by the Food and Drug Administration for other diseases to see if they blocked complement activity in samples of their patients' immune cells. They found that eculizumab, a therapeutic antibody approved to treat another



"When new techniques, new approaches, new people look back at the same subset of patients, new discoveries are made."

-DR. THOMAS WALDMANN



intestinal distress and other symptoms of primary intestinal lymphangiectasia, such as swelling of the extremities and a predisposition to life-threatening blood clots.

Recognizing the opportunity to further illuminate the rare condition, Lenardo and his colleagues analyzed the genes from 11 children with this subset of primary intestinal lymphangiectasia and their families. Each child had two copies of a defective gene called *CD55* that prevented the production of a cell surface protein also called CD55. This protein helps regulate the immune system by blocking the activity of a group of proteins called complement.

Complement can help fight infections by punching holes in the cell membranes of bacteria and other infectious agents, but can also—if left unchecked—damage the body's tissues. This unchecked complement activity, Lenardo explained, may

rare condition called paroxysmal nocturnal hemoglobinuria, successfully decreased complement production in the cells.

"People with CHAPLE disease lack CD55 protein and, with it, the ability to control complement activity," said Lenardo in a release following publication of his findings in the *New England Journal of Medicine*. "The question is whether treating people with a substitute for CD55's activity can help slow or reverse the symptoms of this disease."

Physicians from Lenardo's group and other teams around the world are now studying eculizumab in people with CHAPLE disease with the hope that the therapeutic could become the first effective treatment for the disorder—a profound discovery for a disorder first described decades earlier in the very same research hospital. **R**



Brenda Iriele, Brandon Davis (c) and Bernard Ndedi spent their summer working on the *Atlas of Human Malformation Syndromes in Diverse Populations* as part of the NIH Summer Internship Program in Biomedical Sciences.

PHOTO: ERNESTO DEL AGUILA III

Interns Help Expand Critical Resource for Diagnosing Patients

BY KIARA PALMER

Brenda Iriele grew up seeing first-hand the human cost of inadequate health care. Raised in Nigeria, a country where only two health care providers are available per 1,000 residents, she knew early on that she would devote her career to reducing health disparities experienced by people throughout the world. Now a medical student at Howard University College of Medicine in Washington, D.C., she's at a critical juncture in her career, trying to determine how to make that ambition a reality.

Iriele is one of three interns who spent the summer at the National Human Genome Research Institute as part of the NIH Summer Internship Program in Biomedical Sciences. She used her time to advance biomedical research that will have a direct impact on patients with genetic disorders.

Her summer project was to assist scientists with building out the *Atlas of Human Malformation Syndromes in Diverse Populations*, an online resource that helps health care providers diagnose patients who come from geographically diverse regions of the world. Using the atlas, physicians can compare physical traits and symptoms of their patients with photos and descriptions of people with the same condition and ancestry around the world.

"In Nigeria, there is a high rate of genetic malformations due to a high fertility rate," said Iriele. "This atlas is something that is valuable to countries, like mine, that don't have the infrastructure or resources for genetic screening."

Iriele focused on patients with Turner syndrome (TS), a chromosomal condition affecting development in females. She collected images and symptom data from individuals of varying descents to evaluate whether these patients suffered from TS. Her findings will not only be included in an upcoming paper, but also will be incorporated in the atlas, helping doctors in search of a diagnosis

access images of their patients' symptoms. TS symptoms include extra folds of skin on the neck, swelling of the hands and feet and skeletal abnormalities.

"Our interns are contributing to a resource that can save lives and provide accurate diagnostics in countries that are limited in their resources," said Dr. Max Muenke, atlas co-creator and chief of NHGRI's Medical Genetics Branch. "This is an amazing opportunity for students who are interested in pursuing careers as clinicians to work on the atlas."

Every year, thousands of applicants compete for spots in the NIH Summer Internship Program, which places interns at NHGRI and other institutes to conduct basic and clinical research.

Applicants come from diverse backgrounds, but are all looking to grow their skill sets and shape their interests in the biomedical sciences and health care.

Bernard Ndedi, a 21-year-old medical student from Cameroon, collected images on Fragile X syndrome from physicians around the world and assessed the data for the atlas. Fragile X is a genetic condition that causes a range of developmental issues, including learning disabilities and cognitive impairment. The second-year Howard College of Medicine student believes the atlas can be used in countries that don't have access to genetic and facial screenings and quickly provide therapies to children and adults who need it.

"As a physician, I would not only help people like me, but educate them on various health issues to further medical research and care in those countries," said Ndedi.

Dr. Paul Kruszka, one of the three atlas co-creators, agrees that this is a growing field and believes preparing the next generation of researchers is vital.

"More genetic and genomic research is needed in developing countries," said Kruszka, "and our summer interns are helping to bridge the global health disparity gap in rare disease and genetic syndromes."

Brandon Davis, an aspiring physician currently pursuing his undergraduate degree at Washington University in St. Louis, is getting a glimpse of what it's like to help patients by contributing to the atlas. During his internship, he measured images of malformations and physical characteristics of Cornelia de Lange syndrome, a developmental disorder that is characterized by short stature, intellectual disability and abnormalities of bones in the arms, hands and fingers.

"This project is so important to me because it allows us to provide a diverse set of findings so patients receive accurate diagnoses and, hopefully, treatment," said Davis.

In addition to learning about the disorder and contributing to the atlas, Davis spent his free time picking the brains of his fellow interns, inquiring about their medical school experience and getting advice that will inform the next steps in his career.

The application period for the 2018 NIH Summer Internship Program will open Nov. 15 and closes on Mar. 1, 2018. [R](#)

HR Debuts New Web Site

More than a year ago, the Office of Human Resources information management team began conducting user testing on the OHR web site. They wanted to gauge employees' level of satisfaction as they were using the site. When testing was complete, it was clear that a new kind of site was needed.

The team conducted three focus groups with all types of users across NIH, including administrative personnel, interns, management analysts, managers and program analysts. They collected information concerning main navigation, design, language, style, structure and more. Then they did more user testing—this time by giving users a mockup of what the new site could look like. Also, user testing was completed with the public.

Now, thanks to all the feedback, the new OHR web site is here. Changes include:

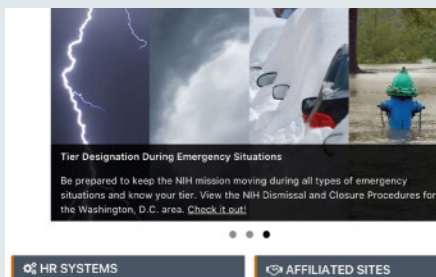
◀ Simplified language and labeling, focusing strictly on HR topics to make it easier to understand for the average user

◀ A modern design with an intuitive navigation

◀ Audience pages for new, current and retired employees, with quick links to help you jump to information easily

◀ A repository of frequently asked questions by HR topics

◀ Streamlined HR topics for a public web site. NIH employee-only topics (off-boarding, HR systems information, etc.) have been moved to the IntraHR site.



If you go to the old link—hr.od.nih.gov—you will be automatically redirected to <https://hr.nih.gov>. So make sure to bookmark the new link.

HR wants to hear from you and continue to improve the site. Provide feedback by completing the "Can We Make This Page Better?" form at the bottom of each page.



PHOTO: LSOPHOTO/ISTOCK

Exposure to Pet, Pest Allergens During Infancy Linked to Reduced Asthma Risk

Children exposed to high indoor levels of pet or pest allergens during infancy have a lower risk of developing asthma by 7 years of age, new research supported by NIH reveals. The findings, published Sept. 19 in the *Journal of Allergy and Clinical Immunology*, may provide clues for the design of strategies to prevent asthma from developing.

While previous studies have established that reducing allergen exposure in the home helps control established asthma, the new findings suggest that exposure to certain allergens early in life, before asthma develops, may have a preventive effect. The observations come from the ongoing Urban Environment and Childhood Asthma study, funded by NIAID through its Inner-City Asthma Consortium.

"We are learning more and more about how the early-life environment can influence the development of certain health conditions," said NIAID director Dr. Anthony Fauci. "If we can develop strategies to prevent asthma before it develops, we will help alleviate the burden this disease places on millions of people, as well as on their families and communities."

Gulf Spill Oil Dispersants Associated with Health Symptoms in Cleanup Workers

Workers who were likely exposed to dispersants while cleaning up the 2010 Deepwater Horizon oil spill experienced a range of health symptoms including cough and wheeze, and skin and eye irritation, according to NIH scientists. The study appeared online Sept. 15 in *Environmental Health Perspectives* and is the first research to examine dispersant-related health symptoms in humans.

Oil dispersants are a blend of chemical compounds used to break down oil slicks into smaller drops of oil, making them easily degraded by

natural processes or diluted by large volumes of water. The study estimated the likelihood of exposure to dispersants, based on the types of jobs the workers did and where. Individuals who handled dispersants, worked near where dispersants were being applied or had contact with dispersant equipment reported the symptoms they experienced during oil spill cleanup as part of the Gulf Long-term Follow-up (GuLF) study.

The research team found that workers exposed to dispersants were more likely to experience certain symptoms—cough, wheeze, tightness in the chest and burning in the eyes, nose, throat or lungs—than those who were not exposed.

Dr. Dale Sandler, GuLF study leader at NIEHS, said the findings only apply to workers involved in the cleanup effort and not the general public.

"The health effects that we see in the workers don't necessarily apply to the community at large, although many of the workers live in affected areas," Sandler said.

Life-Saving Post-ER Suicide Prevention Strategies Are Cost Effective

Three interventions designed for follow up of patients who are identified with suicide risk in hospital emergency departments save lives and are cost effective relative to usual care. A study led by researchers at NIMH modeled the use of the approaches in emergency departments and found that all three interventions compare favorably with a standard benchmark of cost-effectiveness used in evaluating health care costs.

One intervention, sending caring postcards or letters following an emergency visit, is more effective and less expensive than usual care. The report appeared in the Sept. 15 issue of the journal *Psychiatric Services*.

According to the Centers for Disease Control and Prevention, suicide is the 10th leading cause of death in the United States; 44,193 people died by suicide in the U.S. in 2015 (the most recent year for which statistics are available). One approach to reducing the suicide rate is to direct prevention strategies at high-risk groups or settings. An example is emergency departments, which according to the CDC, treat more than 500,000 people each year for self-harm injuries.

"In the face of a gradually rising suicide rate, the need for effective prevention strategies is urgent," said NIMH director Dr. Joshua Gordon. "These findings of cost-effectiveness add to the impetus for implementing these life-saving approaches. Importantly, they also make a strong case for expanding screening, which would allow us to reach many more of those at risk with life-saving interventions."



PHOTO: ICONOGENIC/ISTOCK

Researchers Turn to Creative Approaches to Battle Kidney Stones

Can a high-tech water bottle help reduce the recurrence of kidney stones? What about a financial incentive? Those are questions NIH-funded researchers will seek to answer as they begin recruiting participants for a 2-year clinical trial at 4 sites across the country. Scientists will test whether using a smart water bottle that encourages people to drink more water, and therefore urinate, will reduce the recurrence of urinary stone disease, commonly referred to as kidney stones. NIDDK is supporting the trial.

The randomized trial, known as the Prevention of Urinary Stones with Hydration study, or PUSH, will enroll 1,642 people, half in an intervention group and half in a control group. The study's primary aim is to determine whether a program of financial incentives, receiving advice from a health coach and using a smart water bottle will result in reduced risk of kidney stone recurrence over a 2-year period. The water bottle, called Hidrate Spark, monitors fluid consumption and connects to an app.

Those in the intervention group will be asked to drink a specific quantity of fluids based on each person's urine output. They will also be given financial incentives if they achieve their fluid targets. They will also meet with a health coach who will help identify barriers to drinking more liquids and help solve them.

In the United States, the prevalence of urinary stones has nearly doubled in the past 15 years, affecting about 1 in 11 people. Little high-quality research exists about how to prevent stones and most therapies treat people with the condition only after they are in excruciating pain.

Ostell Named NCBI Director

Dr. James Ostell has been named director of the National Center for Biotechnology Information, a division of the National Library of Medicine. He has been with NCBI since its inception in 1988 and has helped shape it into one of the most widely used biomedical resources in the world.

NCBI, established by Congress in 1988, supports and maintains a series of biomedical databases including PubMed, GenBank, BLAST, Entrez, RefSeq, dbSNP, PubMed Central and dbGaP. It also provides researchers with access to analysis and computing tools to better understand genes and their role in health and disease.

“We at NLM, as well as the world research community at large, are fortunate to have Dr. Jim Ostell as director of NCBI,” said NLM director Dr. Patricia Flatley Brennan, who made the appointment. “He brings not only a wealth of insight and experience, but also vision, creativity and a deep commitment to public service. He holds the respect of the entire NCBI workforce as he shepherds NCBI into a model organization embracing discovery and excellence in technical development. His appointment will ensure the continued preeminence of NCBI and perpetuate its outstanding record of achievement.”

Prior to his appointment, Ostell served as chief of NCBI’s Information Engineering Branch. In that role, he was responsible for designing, developing, building and deploying production resources at NCBI.

In 2007, Ostell was elected to the Institute of Medicine (now the National Academy of Medicine). In 2011, he was named an NIH distinguished investigator, an honor reserved for senior investigators at the highest level of career accomplishment.

Ostell earned a Ph.D. in molecular biology from Harvard University. Before joining NCBI, he developed commercial molecular biology software.



Dr. James Ostell

Ly To Co-Direct NIDCD Clinical Trials Program

NIDCD welcomes Dr. Trinh Ly to its Clinical Trials Program, which she will co-direct, along with Dr. Steven Hirschfeld. She will oversee the extramural clinical trials program, supporting research in communication disorders, including behavioral, device and therapeutic interventions.

Ly served for 14 years as a medical officer for the Division of AIDS, NIAID. Within the Complications & Co-infections Research Branch, part of the Therapeutics Research Program at NIAID, Ly ensured participant safety and research excellence in international, multi-site clinical trials. She provided leadership and scientific expertise to diverse extramural clinical trials research teams addressing global health issues related to HIV/AIDS, associated co-infections and non-infectious complications.

Ly planned, implemented and managed the Comprehensive International Program of Research on AIDS (CIPRA) projects in South Africa, Haiti, Senegal, Thailand and Cambodia. CIPRA successfully established the long-term clinical research capacity necessary to conduct clinical trials in resource-limited settings.

Ly earned her M.D. from the University of Maryland School of Medicine. 



Dr. Trinh Ly

Event To Honor Rep. Louis Stokes, Oct. 12

“Celebrating the Life and Legacy of the Gentleman from Ohio,” a fireside chat with NIH director Dr. Francis Collins and the family of former U.S. Congressman Louis Stokes, will be held Thursday, Oct. 12 from 1 to 3 p.m. at Louis Stokes Laboratories (Bldg. 50). The event is hosted by the National Institute on Minority Health and Health Disparities and the NIH Office of the Director. All are welcome.

NHLBI Studies Need Volunteers

NHLBI researchers need volunteers with Williams syndrome, supralvalvar aortic stenosis or good health for a study at the Clinical Center to learn how narrow or stiff blood vessels impact heart, lungs, gut, kidneys and brain. Study-related tests are provided at no cost. Compensation and travel assistance may be provided. For more information, call the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read more online at <https://go.usa.gov/xN9Yz>. Refer to study 16-H-0144.

Study of Hereditary Stomach Cancer

NCI researchers need volunteers with hereditary stomach cancer or at risk for hereditary stomach cancer for a clinical study at the Clinical Center. This study investigates hereditary forms of stomach cancer and the genes that may cause them. All study-related tests and procedures are provided at no cost. For more information, call the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read more online: <https://go.usa.gov/xX78F>. Refer to study 17-C-0043.

Healthy Volunteers Needed

NIAID researchers seek healthy volunteers, 18-50 years old, for an investigational vaccine study targeting respiratory syncytial virus (RSV). Compensation is provided. For more information, call 1-866-833-5433 (TTY 1-866-411-1010). Email vaccines@nih.gov or visit <http://bit.ly/2nOkOvY>.

Diet Study Needs Volunteers

NIAAA researchers are testing if a ketogenic diet will help with the symptoms of alcohol withdrawal and brain function in individuals with alcohol use disorder undergoing treatment of alcohol detoxification at the Clinical Center. For more information, contact the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read about the study at <https://go.usa.gov/xRefA>. Refer to study 17-AA-0192.

Study Needs Heavy Drinkers

NIAAA researchers seek heavy drinkers for a study evaluating alcohol intake and brain function for a study at the Clinical Center. Compensation and travel assistance may be provided. For more information, call the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read more at <https://go.usa.gov/xX75y>. Refer to study 14-AA-0192.

Flu Vaccine Study Recruits Healthy Vols

Vaccine Research Center researchers seek healthy volunteers, 18-70 years old, for an investigational influenza vaccine study. Scientists are testing new vaccines to determine if they are safe and effective in preventing the flu. Compensation is provided. For more information, call 1-866-833-5433 or email vaccines@nih.gov. Read more at <https://go.usa.gov/xNH7U>. Refer to study VRC316.

NIA's Summer Student Poster Day Celebrates 25 Years

Student scientists from across the United States showcased their work recently at the 25th annual National Institute on Aging Summer Program Poster Day. The special event featured work from summer interns from NIA and the National Institute on Drug Abuse, which both house intramural labs at the Biomedical Research Center in Baltimore.

It was 25 years ago that Dr. Barbara A. Hughes, former director of NIA's Office of Minority Recruitment and Human Relations, organized the first poster session with just 5 students. This year, Hughes was on hand to see posters presented by 46 of the 53 summer students. She was joined by some 40 program alumni who came back to Baltimore for the anniversary.

Overall, some 1,200 students have participated in the program over the years.

Hughes, today's Summer Program leadership and alumni have seen how the program can help change lives.

"Young researchers need a place that they find motivating and where they can do meaningful work," said Hughes. "The NIA Summer Program allows students to explore, discover new methodology and it levels the playing field regardless of what high school or college one may have attended."

The high school, college and post-graduate students do research in one of three areas—neuroscience, aging biology and translational gerontology. They work alongside researchers, from lab chiefs to fellows, who work in disciplines that range from basic science to clinical research and epidemiology. This year, for example, students looked at age-related changes in physiology and the ability to adapt to environmental stress as it affects age-related disease.

The 8- to 10-week summer internship program culminates in students' presentation of posters to NIH scientists on a wide range of research topics. NIH investigators, administrators and other trainees



Dr. Barbara Hughes and Hughes award winner Zachary Cook, a rising senior at the University of Rochester and a U.S. military veteran

PHOTOS: THOMAS WYNN

judge which presentations are the best.

"Poster Day itself seeks to provide students the opportunity to present their work to NIA scientists," said Arlene Jackson, an intramural recruitment specialist who facilitates the summer program with help from Taya Dunn-Johnson, a program assistant in the Office of the Scientific Director.

This year's interns said the program helped them hone their interests and map out their future careers.

Davis Truong, a senior at the University of Maryland, talked about the camaraderie and spirit of collaboration he experienced. When he started his internship with the Laboratory of Clinical Investigation, he wasn't sure what he wanted to study. His mentor, Dr. Ruin Moaddel, helped him figure that out. Truong presented a poster on the NAD metabolome, which indicates how a cell or tissue performs processes that show the state of nutrition, health and disease.

Kaysi Gray, a senior at Howard University, spent the summer in the Laboratory of Clinical Investigation and presented a poster on how different modes of growth hormone administration

influence human physiology.

"The program opened my eyes to what opportunities are out there," she said. Always interested in medical school, Gray is now also considering a post-baccalaureate program or a master's degree in public health.

Outstanding posters were selected for the Barbara A. Hughes Award of Excellence, which established a competition among students aimed at further engaging them and NIA scientific faculty in the pursuit of high-quality research.

Presentations by an alumni panel and speaker highlighted a discussion about possible career paths for the current interns.

"We can see the impact of the program, evidenced by the engagement of so many alumni," said Dr. Michele Evans, deputy scientific director and intramural training director, who leads the Summer Program. "By being here and sharing what they have experienced, they give testimony to how their internships not only afforded them an opportunity to work with extraordinary scientists, but [also] how those interactions helped them build confidence toward careers in research."

An alumnus of the 2002 summer class, Dr. K. Torian Easterling, was this year's alumni speaker, focusing on "A Commitment to Advancing Health Equity at the Neighborhood Level." Easterling is a community-based physician and assistant commissioner of the Brooklyn Neighborhood Health Action Centers, Center for Health Equity, at the New York City department of health and mental hygiene, which promotes health equity in low-income communities of color in New York. His advice for summer interns? "Stay true to what your passion and your mission is. This program can help get you to that point."

Looking to next summer, the program will start accepting applications for summer 2018 from mid-November of this year to Mar. 1, 2018. Although many of the NIA summer interns are interested in gerontology and geriatrics, the program is open to any student interested in biomedical research.



The summer class of 2017 poses with Dr. K. Torian Easterling (l) and Dr. Marie Bernard (r), NIA deputy director.