

## Activity Trackers Can Benefit Lifestyle Changes

BY ERIC BOCK

An activity tracker can be a valuable tool to motivate a person to lead a more active lifestyle if it's used to measure progress over time. That's the advice Dr. Kong Chen has for people who received a device over the holidays or bought one to follow through on a New Year's resolution.

These wireless devices provide information about a person's habitual activity levels and exercise patterns. Depending on the type and model, an activity tracker can monitor heart rate; count steps, stairs climbed and calories burned; and provide a snapshot of sleep quality. And they can be

worn on the wrist, upper arm, ankle or waist.

"The ultimate goal of an activity tracker is to help you achieve and maintain an active lifestyle," said Chen, director of the human energy and body weight regulation core and acting chief of the energy metabolism section in the Diabetes, Endocrinology and Obesity Branch at NIDDK. "I would not recommend using an activity tracker's calorie estimation to plan a diet."

He said most people who buy fitness trackers are probably trying to lose weight.

Activity trackers contain a device called



NIDDK's Dr. Kong Chen says activity trackers are useful, but only when used appropriately.

PHOTO: ERIC BOCK

an accelerometer, which detects when a person is active, sedentary or asleep, based on movement. He said an algorithm uses the

SEE **TRACKERS**, PAGE 8



Dr. Sheila West of Johns Hopkins University's Wilmer Eye Institute

## West Links Environmental Change to Eye Health Hazards

BY KATHRYN DEMOTT

Another reason to worry about climate change: Expanding areas of arid land, air pollution and greater exposure to ultraviolet (UV) radiation all present potential health hazards to your eyes, according to Dr. Sheila

SEE **EYE HEALTH**, PAGE 6

## 'AUDACIOUS GOALS'

### Sanes Kicks Off Seminar Series in Neuroregeneration

BY DUSTIN HAYS

Like a computer, the central nervous system employs vast circuits to collect and process information, enabling us to walk, talk, think and see. But instead of silicon chips to relay signals, our circuits are built from long, wiry cells called neurons. Dr. Joshua Sanes recently visited NIH to talk about his research aimed at understanding how neurons connect to form these circuits. His talk was the first in the new NEI Audacious Goals Initiative (AGI) Seminar Series in Neuroregeneration.

Sanes is director of the Center for Brain Science and professor of molecular and cellular biology at Harvard University. He is also a member of the NEI AGI steering committee. The AGI is an NEI-led effort to catalyze vision research by leveraging

SEE **SANES**, PAGE 4



NIH bids adieu to head of Exec Sec; see p. 10.

## ALSO THIS ISSUE

Briefs .....	2
Future of Point-of-Care Research .....	3
Longtime NIH Landscape Architect Retires ..	5
Volunteers .....	7
Digest .....	9
Milestones .....	10

## Medicine: Mind the Gap Webinar Set, Jan. 29

A Medicine: Mind the Gap webinar titled “Time-Varying Effect Modeling to Study Developmental and Dynamic Processes” will take place Friday, Jan. 29 from 1-2 p.m. via NIH Videocast. The speaker is Dr. Stephanie Lanza, professor of biobehavioral health and scientific director at the Methodology Center, Pennsylvania State University.

She will discuss time-varying effect modeling (TVEM), a novel method that enables health, behavioral and social scientists to examine developmental (i.e., age-varying) and dynamic (i.e. time-varying) associations. The goal of the webinar is to generate new research questions that can be addressed using TVEM and to provide resources for researchers interested in using the models in their own work.

Lanza will accept questions about her presentation via email at [prevention@mail.nih.gov](mailto:prevention@mail.nih.gov) and on Twitter with #NIHMTG.

For more information and to register, visit <https://prevention.nih.gov/programs-events/medicine-mind-the-gap>. View the live videocast at <https://videocast.nih.gov/>.

## Your Science on Our Masthead

The new design of the *NIH Record*, which debuted last September, relies on high-resolution color scientific images for the masthead on p. 1. Many of the initial images hailed from the *Life: Magnified* exhibit of photographs. More fresh images are needed for future issues of the *Record*. If your laboratory has a candidate image for our use, email the editors a jpg, along with a brief caption and credit line. Since the space we need to fill is horizontal, images that work best in that orientation are most appreciated.

## MLK National Day of Service, Jan. 18

NIH joins the nation in celebrating Dr. Martin Luther King, Jr. Day on Monday, Jan. 18. On this National Day of Service, Americans across the country recommit themselves to citizen action by volunteering in service to one another. The national theme, “A Day On, Not a Day Off,” encourages everyone to honor King and his legacy of service to all.

“The holiday shines a light on service as a powerful force to bridge economic and social divides,” said NIH director Dr. Francis Collins. “I encourage every member of the NIH community to join the nation in helping make health, peace and prosperity a reality for all. As we commemorate and honor Dr. King’s legacy, I invite you to visit the Office of Equity, Diversity and Inclusion’s Twitter page for MLK Day of Service activities.” You can access the page at [http://Twitter.com/nih\\_edi](http://Twitter.com/nih_edi).

For more information, contact Victoria Gross, Office of Equity, Diversity and Inclusion, at (301) 451-0746 or [Victoria.Gross@nih.gov](mailto:Victoria.Gross@nih.gov).



NIAMS staff and Coalition co-chairs gather around NIAMS director Dr. Stephen Katz (c).

## NIAMS Coalition Gathers for Outreach, Education

More than 50 representatives of the NIAMS Coalition recently attended its biennial Outreach and Education Meeting: Creating Connections for Science. Attendees learned about the programs and opportunities available at NIH and NIAMS and exchanged ideas about how to effectively collaborate with the institute and with one another. The Coalition is a group of more than 90 professional and voluntary organizations concerned with the NIAMS portfolio.


NIAMS director Dr. Stephen Katz described how collaborative research, conducted among NIH institutes and through public-private partnerships, has a synergistic effect on advancing medical research. He noted the progress made in rare disease research, emphasizing its importance in providing greater insight into the mechanisms and treatments for common diseases. He also reiterated that NIAMS and NIH investments in basic research frequently serve as the foundation for future treatments, citing NIAMS scientific director Dr. John O’Shea’s role in discovering the signaling pathway that eventually paved the way for a new treatment for rheumatoid arthritis.

Mary Woolley, president of Research!America, offered the latest public opinion research on the importance of science in public policy. Despite the apparent lack of scientific understanding among the public, people want their political leaders to have basic scientific knowledge. They also want public policy to be based on sound science and are willing to share their health information to improve patient care and advance medical research.

Attendees learned from Office of Research on Women’s Health director Dr. Janine Clayton about NIH’s efforts to require that sex variables be factored into all aspects of research—from basic to clinical—to enhance scientific rigor and transparency and ultimately to ensure that both women and men get the full benefit of medical research. This, Clayton emphasized, is an essential step toward personalized medicine.

Breakout sessions covered topics such as leveraging resources to improve research opportunities; policies to enhance clinical research; collaborations to foster innovative research and training; and best practices for sharing health information online.

The meeting concluded with a presentation by Dr. Gwynne Jenkins from the NIH Office of Science Policy. She introduced the NIH Precision Medicine Initiative Cohort Program, an effort to recruit 1 million or more people to study their genetics, biospecimens and factors such as lifestyle habits and environmental exposures, to better understand the variables that contribute to health and disease. Jenkins discussed the program’s emphasis on fostering open, responsible data-sharing among researchers, coupled with the highest regard for patient privacy. The program will also ensure that participants have access to and control over their own data and how it will be shared.

“The Coalition leads efforts at the federal level to promote and educate all stakeholders on the importance of the research funded by the NIAMS,” said Coalition co-chair Mary Wheatley of the Rheumatology Research Foundation. “There is no end to the collaborative opportunities that exist between the NIAMS Coalition and its member organizations.”—Mimi Lising 



Katz with Mary Woolley, president of Research!America

## NIH Discusses Future of Point-of-Care Research

BY JESSICA MEADE

More than 250 scientists, clinicians and engineers convened recently to discuss current developments and future research challenges in the area of point-of-care (POC) technologies—be it at a bedside in a remote village or on a battlefield. The meeting was co-hosted by NIH and the Institute of Electrical and Electronics Engineers.

Point-of-care technologies encompass a broad range of diagnostic tests and treatment tools, some of which are already ubiquitous. Primary care physicians use quick-Strep tests and other rapid bacteria tests before prescribing antibiotics. Women have been using over-the-counter pregnancy tests for years and diabetics prick their fingers to monitor blood sugar levels instantly.

With the widespread use of smartphones and the advanced computing power they afford, a growing number of complex technologies are already being developed, from a solar-powered PCR machine that can detect HIV, to smart apps that can communicate patient information directly to a doctor many miles away.

“The conference was designed to map out a research plan for the future by bringing stakeholders from various backgrounds in health care, government, academia, small business, large businesses and non-profits together,” said Dr. Tiffani Lash, program director of sensors and telehealth at the National Institute of Biomedical Imaging and Bioengineering and conference co-chair.

Speakers included many investigators in the NIBIB-funded Point-of-Care Research Network, a group including Boston University, Johns Hopkins University and Massachusetts General Hospital. They discussed the latest advances in POC research including rapid HIV testing, a microscope that can diagnose the beginning stages of cervical cancer and a clinical trial in Baltimore where patients conduct at-home gonorrhea and chlamydia tests and mail in their sample to find out the results.

Dr. Rebecca Richards-Kortum, an investigator from Rice University, made clear the urgent need for more point-of-care



NIBIB's Dr. Tiffani Lash speaks at conference.

diagnostics in Malawi, where the risk of a woman getting cervical cancer is 7.4 percent, the highest in the world, and 5.2 percent of women die from it. Pap smear, the traditional form of cervical cancer screening, cannot be conducted in rural areas since it requires a laboratory and trained technicians. Richards-Kortum described an interaction with a clinic director on a recent trip to the country.

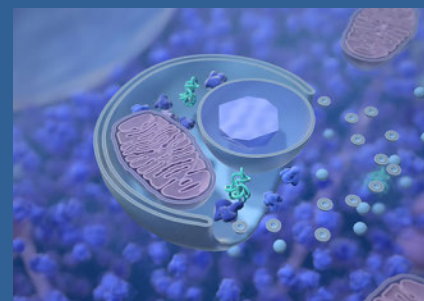
“I asked him, ‘What can we develop that would help you combat this disease?’” she said. “He pulled out a jar of liquid morphine and told me, ‘We have many women dying from cervical cancer so we leave them bottles of morphine. But at night, they cannot see very well in the dark and often make mistakes when pouring out their dosages. Do you think that you could make something that would make sure they get the proper dosage?’ It was very humbling and shows the desperate need for better POC cervical cancer diagnosis.”

The conference also gave attendees the chance to discuss challenges the field is facing and how best to gain patient and physician acceptance of new point-of-care devices. The challenges are not trivial—new devices must be inexpensive and small, fast but accurate and require ease in sample acquisition and training.

“This was very much a working conference, where speakers and attendees will build high-value connections, strategic alliances and partnerships that will help create lifesaving new technologies and make a massive impact in clinical care,” said Dr. Atam Dhawan, vice provost for research and distinguished professor,

New Jersey Institute of Technology and conference co-chair. “At the end of the conference, a task force was formed to develop a white paper on future strategic direction for POC technologies.”

Dr. Jim Gallarda, senior program officer at the Bill and Melinda Gates Foundation, summed up the conference: “What we came to realize from the multitude of stakeholder perspectives is that to move forward we can, and must, collectively co-create the future. This will happen when all of us, from diagnostics innovators to health care professionals in both developed and developing countries, work together to respond with effective POC solutions capable of addressing global health care needs.” **R**



ON THE COVER: Animation demonstrating a model of autophagosome formation.

IMAGE: NIH MEDICAL ARTS

### The NIH Record

Since 1949, the *NIH Record* has been published biweekly by the Editorial Operations Branch, Office of Communications and Public Liaison, National Institutes of Health, Department of Health and Human Services. For editorial policies, email editor or phone (301) 496-2125.

**Editor:** Rich McManus  
[Rich.McManus@nih.gov](mailto:Rich.McManus@nih.gov)

**Associate Editor:** Carla Garnett  
[Carla.Garnett@nih.gov](mailto:Carla.Garnett@nih.gov)

**Staff Writers:**  
Eric Bock • [Eric.Bock@nih.gov](mailto:Eric.Bock@nih.gov)  
Dana Talesnik • [Dana.Talesnik@nih.gov](mailto:Dana.Talesnik@nih.gov)

Subscribe via email: [listserv@list.nih.gov](mailto:listserv@list.nih.gov) Follow: <http://nihrecord.nih.gov/>



The *NIH Record* is recyclable as office white paper.

**NIH** National Institutes of Health  
*Turning Discovery Into Health*

## Sanes

CONTINUED FROM PAGE 1

recent major scientific advances. Central to the AGI is the audacious goal of restoring sight through regeneration of neurons of the retina—the light-responsive tissue in the back of the eye—and their connections to the brain.

Although Sanes has been a neurobiologist for many years, his attention to the retina is relatively new. Why the retina? The retina is the best available model for studying neuronal circuits, he said. Scientists can use light to control input to retinal circuits. And output from the circuits can be recorded easily because all retinal neurons converge at the optic nerve before extending to other parts of the brain. And, Sanes said, the retina is the only part of the central nervous system that is accessible without surgery. It even comes with its own lens, he said.

Sanes outlined his lab's characterization of a retinal circuit that detects direction of motion, for example, a ball moving across a

★ ★ ★

***“AGI aims to regenerate neurons to make a difference in human vision.”***

—DR. PAUL SIEVING

★ ★ ★

scene. To understand the formation of these complex circuits, composed of multiple cell types, it's critical to identify factors that help guide their wiring pattern. Using various techniques, including genetically modified mice, Sanes and colleagues found that specific signaling molecules called cadherins dictate configurations of neurons. Like color-coded wires, the cadherins guide neurons to their appropriate junctions.

Motion-detecting circuits are dedicated to this one job. There are more than 100 different types of neurons in the retina that intermingle to form distinct circuits with other dedicated functions. The result is what Sanes described as a series of 30 or more parallel images, each detecting a different feature, such as color, size and texture. “The retina then sends this information to the brain, which has the job of reconstructing



Dr. Joshua Sanes gives first AGI lecture.

these images to give you the illusion that you've seen the world as it is,” he said.

Sanes summarized recent technological advances that he and other scientists are using to study neuronal circuits. He is particularly enthusiastic about a technique called drop-seq, which allows measurement of RNA in single cells. Since RNA is made by the genes that are active in unique cell types, a cell's pattern of RNA expression provides a way to identify it. Like reading a barcode, drop-seq allows scientists to quickly scan and classify cells. Many cells that are currently classified together based on appearance might be re-classified based on their RNA expression patterns and functions.

Sanes' work holds relevance for the development of neuroregenerative therapies, especially therapies for retinal diseases. Loss of retinal neurons is responsible for the majority of blindness in the U.S. There are hundreds of rare diseases that can cause degeneration of retinal neurons. Common ones include glaucoma, age-related macular degeneration and diabetic retinopathy.

“AGI aims to regenerate neurons to make a difference in human vision,” NEI director Dr. Paul Sieving explained during introductory remarks. Whereas humans cannot regenerate retinal neurons, other animals can, he said, citing goldfish as an example. AGI is about recapitulating this process as a therapy for humans.

Visit <https://nei.nih.gov/audacious/> to view Sanes' talk and learn about upcoming seminars. **R**

## Grady Receives AACN 'Policy Luminary' Award

At its recent meeting, the American Association of Colleges of Nursing (AACN) awarded the 2015 Policy Luminary Award to Dr. Patricia Grady, director of the National Institute of Nursing Research.

“Dr. Grady's illustrious career in nursing science has paved the way for advancing health care policy on numerous fronts,” said Dr. Deborah Trautman, president and CEO of AACN. “Her leadership over NINR for the past 20 years, coupled with her own extensive research portfolio, has helped to ground health policy decisions in evidence. National dialogues on how to improve quality of life, promote health, wellness and reduce burden and cost are more informed when nursing



From l, AACN CEO and president Dr. Deborah Trautman, NINR director Dr. Patricia Grady and AACN board chair Dr. Eileen Breslin

PHOTO: AACN

research, and in particular that of NINR, is not only included, but translated into policy. Dr. Grady has taken up this cause by working with her colleagues across other institutes and disciplines within NIH and the broader research community.”

In brief remarks, Grady recognized “the reciprocal relationship between research and policy,” and noted that NINR works “to align our research to be cognizant of society's most pressing needs so as to improve practice and advance the education and training of the next generation of nurse researchers.” She added, “AACN has been a major force in these efforts, with its policy agenda and numerous conferences that create venues for important discussions on research, policy and training.”—Lindsey O'Keefe **R**

## NIH Landscape Architect Mueller Retires After Nearly 37 Years

BY CARLA GARNETT

After more than 3½ decades, the self-described “tree hugger” who adopted the NIH campus and cared for it like it was his own backyard is leaving these green pastures for more leisurely pursuits. NIH Landscape Architect Lynn Mueller retired Dec. 31, 2 months shy of 37 years of service here.

Looking back, Mueller’s NIH career got off to a somewhat inauspicious start. It was just after the long President’s Day weekend in February 1979, and the D.C. metro area had just been buried under more than 20 inches of snow, the result of a humongous winter storm that surprised even weather forecasters. Enter Michigan native and Michigan State University graduate Mueller, who had been hired as landscape architect at NIH, sight unseen, after a phone interview.

Before coming here, he was a registered landscape architect at the largest landscape contractor in southeast Michigan. His turf there covered whole towns, “from Toledo up to Saginaw over to Grand Rapids and through much of the Detroit suburbs. So I wondered how 300 acres would keep anyone busy—much less 2 people,” he said, counting himself and Tom Cook, then chief of the Grounds

neurology at the Clinical Center, “making a lot more money than I did,” Mueller said, laughing.

In addition to managing snow-removal, lawn-mowing and tree contractors, his first two assignments were biggies—overseeing the landscaping at the ACRF (the then newly built clinic attached to the front of Bldg. 10) and completion of the grounds at the Lister Hill Center (Bldg. 38A). Construction on those areas was concluding and Mueller’s job was to make sure the government was getting everything it paid for, in terms of landscape installation and site restoration.

“[From the beginning] Tom had me out inspecting the grounds, looking for trouble spots, which I still do today,” Mueller said. “I’m always looking for areas that need to be renovated, unsightly public areas that may need attention.”

But anyone who’s ever paid the slightest attention to NIH out-of-doors knows Mueller didn’t just perform above and beyond the call of duty. He loved the place. In fact, NIH folklore insists Mueller knows every tree and blade of grass by name; that’s probably not much of an exaggeration.



Longtime NIH Landscape Architect Lynn Mueller, after one of the region’s tamer winter storms in 2014

PHOTO: ERNIE BRANSON

“Eventually, the project got recognized and it’s a beautiful habitat,” Mueller said. “What’s been so remarkable is that I’ve had 10 direct supervisors who all have been very supportive of these initiatives over the years. That’s been the basis of my success, having supervisors who have been understanding of these efforts...It’s usually a lot easier to pave over areas and cut down trees than to try and save them. The environment and the landscape are too often afterthoughts.”

“I’ve really enjoyed being Lynn’s supervisor for the last 6 years,” said Jim Lewis, chief of the Specialty Branch in the ORF Division of Facilities Stewardship. “When you supervise somebody like Lynn, who really doesn’t need supervising, you don’t really need to do anything but stay out of the way and maybe sign off on a little paperwork every now and then and the results have been great.”

Mueller’s favorite project (and one with results both historic and international) was the successful cloning of the Tree of Hippocrates, a 1961 gift to the National Library of Medicine from Greece. Mueller had noticed the historic sycamore deteriorating in the late 1980s due to weather and fungal disease. He attempted several different ways to nurse it back to health, to no avail. Then in 2004, he located—in Michigan—the Archangel Ancient Tree Archive, which was able to clone the tree from cuttings Mueller sent. The original tree died in 2013. Two “new” Hippocrates trees were planted here. On Earth Day 2014, the Greek ambassador attended a ceremony celebrating the tree’s rebirth at NIH.

“That was really rewarding,” said Eagle Scout Mueller, who developed an affection for nature, the environment and animals early in life. As for his immediate after-NIH future, Mueller has no specific plans, beyond a bit of travel to expand his birding “life list” and perhaps some skiing. “It’s been an outstanding career,” he concluded. “They say if you enjoy what you’re doing, you’ll never work a day in your life. Well that’s true for me—except having to manage some of those ice and snow ‘Storms of the Century.’” **R**



*“They say if you enjoy what you’re doing, you’ll never work a day in your life. Well that’s true for me—except having to manage some of those ice and snow ‘Storms of the Century.’”*

—LYNN MUELLER



Maintenance and Landscaping Branch in NIH’s Division of Engineering Services, who hired him.

“Originally I wanted to get into the [National] Park Service,” Mueller explained. “I initially turned this job down.”

But Cook was persistent and called Mueller again. Apparently the job series was in a “shortage category”—HR-speak meaning recruiters could sweeten offers to qualified candidates. Mueller would be able to start at the highest grade allowable—GS-7 at the time. In addition, Cook said he needed him to start right away.

“I didn’t even know what N-I-H stood for,” Mueller said, recalling his first impression. “I got here and Tom drove me around the campus, bought me lunch, I accepted the offer and then thought, what have I gotten myself into? Of course it all worked out great.”

Later that same year, he married his sweetheart in Michigan and they replanted themselves in Maryland. A registered nurse, she landed a job in

He was always coming up with creative campus improvements: Use of a “resistograph” device to determine unseen structural tree health; an official tree census in 2000 (although Mueller had taken his own survey 20 years previously); installation of bluebird and purple martin houses and bat houses to control the mosquito population without using insecticides; no-mow meadows and buffer strips that naturally filter out road and parking lot pollutants.

In 2001, he secured \$700,000 for a project to restore the seriously eroded NIH Creek. Mueller remembers those negotiations—competing for reforestation dollars when funding was particularly tight—as some of his most challenging work here. He argued that returning the stream to its natural “greener” state would be crucial for stormwater management in the long run; drawing indigenous wildlife back would be a bonus. NIH management agreed. The eco-friendly restoration also caught the attention of like-minded conservationists, Maryland state foresters and the Department of Agriculture.

## Eye Health

CONTINUED FROM PAGE 1

West, vice chair for research at the Wilmer Eye Institute, Johns Hopkins University. She recently discussed these hazards at a symposium on the health consequences of climate change.

The tissues at the front of the eye—the cornea, eyelid, the white part called the sclera and even the lens—are all exposed to the environment. Adverse environmental changes may therefore have deleterious effects on the eye, West said at the symposium, sponsored by the NIH global health interest group.

Regions of arid land are expanding as rising temperatures and shifting

• • •  
*Another consequence of climate change is an increased burden of airborne particles that can irritate the eye. Air pollution has long been linked to respiratory disorders; more recently it's been shown to play a role in eye disease.*  
• • •

atmospheric circulation patterns force dry air into regions that had previously seen more rain. Drier air means that more people may be likely to suffer from dry eye symptoms, in which tears aren't produced properly or evaporate too quickly.

While there's no evidence that drier

conditions cause dry eye, "it can accelerate symptoms in people who are prone to dry eye. As we see these areas [of drought] spread, we are liable to see people who are prone to dry eye, but who may not be symptomatic, go on to develop symptoms," West said.

### FOCUS ON DEVELOPING WORLD

## Workshop Links Vision Scientists to Information, Research Tools

BY DANIEL STIMSON

If you're a scientist at NEI, it is relatively easy to find and peruse research papers by others in your field. A PubMed search typically leaves you just one or two mouse-clicks away from the full-text paper(s) you're seeking. In part, that's because NIH holds subscriptions to a slew of scientific journals, as do most U.S. research institutions.

Now imagine (or perhaps recall) doing an online literature search from a lab or clinic in southern India, rural China or any other developing part of the world. You're more likely to hit an "Access Denied" page, because poorer research institutions have limited means to pay for journal subscriptions.

NEI and the NIH global health interest group recently hosted a workshop to address this and other issues faced by vision researchers in the developing world. It was a chance for librarians at vision research institutions in unique parts of the world to share challenges and solutions for improving access to scientific publications and other resources. In developing areas, there's an urgent need for improvement. Cataract and other treatable eye conditions are still leading causes of blindness in the developing world.

In India, the urgent need for eye health research and education contrasts sharply with low access to information resources. With prices that have climbed 145 percent overall during the past 6 years, online journal subscriptions are becoming



Participants in the workshop on information resources included (from l) Dr. Erica Raterman, NEI deputy director Dr. Belinda Seto, Sabera Banu, Thandavarayan Kumaragurupari, Pamela Sieving, Dr. John Prakash, Dr. Amy Kullas and Qing Liu.

increasingly difficult to afford, said Thandavarayan Kumaragurupari, a senior librarian at Aravind Eye Hospital and Dr. G. Venkataswamy Eye Research Institute in Madurai. "When Indian research is published in expensive journals, all too often it goes unnoticed by other researchers in India," she said.

Sabera Banu, a librarian at LV Prasad Eye Institute in Hyderabad, India, noted that a powerful, global movement toward open-access publishing has "allowed for wider dissemination of work to developing countries." But open-access journals

tend to cover their publication costs by charging authors rather than readers, which can make it challenging for researchers to get their work into journals at all. And some of the most prestigious journals "still require expensive subscriptions," she said.

A project by the Association of Visual Science Librarians (AVSL) and the Seva Foundation (a U.S.-based charity partnered with Aravind) is working to improve access to journals and information tools for researchers in India and other countries.

In the U.S., about \$3.8 billion is spent annually treating dry eye. Those expenditures are likely to increase as the areas with rising temperatures and increasingly arid conditions expand.

Another consequence of climate change is an increased burden of airborne particles that can irritate the eye. Air pollution has long been linked to respiratory disorders; more recently it's been shown to play a role in eye disease, West said. Drought conditions, now increasingly seen as a consequence of climate change, can prolong the fire season from naturally occurring fires, which emit irritants into the air. As an example of how these fire emissions affect the eye, West pointed to the use of intentional fires set for crop clearing. "We're

Eight eye care institutions in five countries—Aravind and two other centers in India, plus centers in China, Egypt, Nepal and South Africa—will work together to enhance training, resources and collaboration among their vision librarians. The project, called Solution in Sight, was funded by a \$140,000 grant from the Elsevier Foundation, a charitable arm of the Elsevier publishing company. AVSL has played a continuing role, "working with medical and research centers to identify their needs, and to provide mini-grants for staff training, Internet servers and books," said Pamela Sieving, a volunteer with NEI's international programs. She and all of the librarians invited to speak at the workshop are members of AVSL.

Librarian Qing Liu noted that her library at Tianjin Eye Hospital and Medical University in China has a continuing medical education program to train early-career researchers in literature search and evaluation skills. It's important for researchers to appreciate that a "library is not just a place, but a service," she said.

Sieving said she hoped that the workshop would help call attention to opportunities for global collaboration among librarians and among researchers working in the vision sciences. Kumaragurupari offered a case in point. Fungal keratitis (inflammation) in the cornea is a leading cause of vision loss in tropical regions and a major focus of research at Aravind. Though it's less common in the U.S., there are occasional outbreaks, typically from fungal contamination in contact lens solution. In 2009, researchers at Aravind and the University of San Francisco, California, began collaborating on an NEI-funded trial in India that is helping to develop and test better treatments.

seeing more ocular exposure to irritants in the air in these farmland areas," she said.

West's own research has shown that exposure to wood or charcoal cooking fires—ubiquitous in many developing countries—appears to accelerate the scarring caused by trachoma, the leading infectious cause of blindness worldwide. Trachoma is caused by the bacterium *Chlamydia trachomatis*, which is spread through direct contact with an infected eye, or to nasal fluids. Recurrent infections over a lifetime lead to scarring inside of the eyelids, which in turn causes the eyelashes to turn inward and brush against the cornea, eventually resulting in damage that impairs vision.

By studying women living in areas of rural Africa where trachoma is endemic, West found that, after adjusting for other factors that may contribute to trachoma scarring, the more time the women spent cooking over wood-burning stoves, the more likely they were to have moderate to severe scarring of the eyelid.

On another front, ozone depletion can lead to higher levels of UV light exposure, which is a known risk factor for cortical cataract. Chronic exposure to the sun's damaging rays can alter the orderly arrangement of proteins in the lens of the eye or damage lens epithelium, causing the lens to become cloudy.

Efforts such as the Montreal Protocol, an international treaty aimed at phasing out the production of ozone-depleting substances, may help reduce UV levels, "but that may not occur until the middle of the century," West said. Even with the protocol's measures, West and her colleagues estimated that by 2050, rising UV exposure will lead to an additional 150,000 to 200,000 cases of cataract—over and above the expected number associated with aging. West estimates that \$1.1 billion will be spent on care and surgical treatment of these additional cases.

The good news is that these estimates are based on assumptions of how much UV radiation actually reaches the lens of the eye, a controllable risk factor. Wearing a hat can reduce UV exposure by 30 percent. Sunglasses, even simple plastic lenses that offer full UV protection, can reduce exposure by nearly 100 percent.

To watch a video interview with West go to <https://www.youtube.com/watch?v=biCNYpOxPNY>. **R**

## Become a Healthy Volunteer

An NIH research study is enrolling healthy persons ages 18 to 65 who are free of psychiatric disorders and certain medical conditions. Researchers will evaluate the effects of the experimental medication ketamine on brain receptors in healthy and depressed adults. Study includes 1 to 6 weeks of outpatient procedures: a screening visit, computer tasks, rating scales, neuropsychological testing, two intravenous infusions, a blood draw, brain scans (MEG & fMRI) and may include optional 2-4 overnight stays for a sleep study. The study is conducted at the Clinical Center. There is no cost to participate and compensation is provided. To find out if you qualify, email [moodresearch@mail.nih.gov](mailto:moodresearch@mail.nih.gov) or call 1-877-MIND-NIH (1-877-646-3644), TTY 1-866-411-1010. Refer to study 04-M-0222.

## Liver Disease Patients Needed

An NIDDK research team seeks people with fatty liver disease to participate in a study. Researchers are looking at a breath test to measure how the body breaks down food in people with fatty liver disease. If you have been diagnosed with non-alcoholic fatty liver disease or steatohepatitis, you may be interested in participating. Compensation is provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to study 15-DK-0080.

## Study Needs Overweight Adults

NICHD seeks adults who are overweight, have high blood pressure and/or pre-diabetes to participate in a study. Researchers are examining the effects of the medication colchicine on the complications of obesity. Compensation is provided. For more information call 1-866-444-2214 (TTY 1-866-411-1010) Hablamos español. Refer to study 14-CH-0119.

## Volunteers Needed for Energy Study

NIDDK seeks healthy Caucasian females, 18-35 years old, to participate in a research study. Doctors want to learn how the body burns energy at different temperatures. You will have an 8-day inpatient stay at the Clinical Center. Compensation is provided. For more information, contact the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Refer to study 12-DK-0097.



Chen models a variety of activity trackers, which can be worn on the wrist, upper arm, ankle or waist.

## Trackers

CONTINUED FROM PAGE 1

movement data to estimate calories burned based on a person's gender, age, height and weight. Often, a tracker connects to a smartphone, computer or tablet, where users can view summaries of their daily activity and even set goals or challenge their friends on social networks.

Because activity trackers use proprietary algorithms to estimate calories, walking/running distances and sleep quality, it's difficult to determine how accurate or precise their data is without good validations by research studies, Chen cautioned. Because of this, a user should not rely exclusively on the data.

"If a tracker says a person burned 1,000 calories during exercise, he or she shouldn't eat an additional 1,000 calories," Chen said. That could lead to

one part of the stock market. While an index can provide important information about a sector of the economy, an investor shouldn't rely solely on it to make financial decisions. Trackers have similar limitations.

Most consumer activity trackers are, however, "sensitive enough to measure a

unanticipated weight gain due to the potential inaccuracies.

Planning a diet and fitness regime based on one fitness tracker's data is like investing money based on one stock market index, he added.

There are several indexes—each one measuring


change in physical activity levels." In other words, the devices allow users to monitor their progress over time. If, for instance, a person sets a goal to walk more, he or she can use the tracker to measure progress.

Chen compared activity trackers to personal trainers. Both provide motivation and individualized attention. Neither alone can get someone in shape. A person must be committed to losing weight. He admitted that losing weight is not easy because it's "an uphill battle" that doesn't happen overnight.

It takes a lot more than working out to shed excess weight, Chen warned. Besides exercising, people should carefully look at their diet. Losing weight is a complex process influenced by many factors, including a person's age, body composition, family history, other health conditions and lifestyle.

For those considering buying an activity tracker, Chen advises thinking about how they want to use it. If counting steps is a goal, a pedometer will do fine. If someone swims

a lot, he or she should select a waterproof tracker. Chen also suggested that people talk to their friends about what kind of devices they use. The user should view the activity tracker as a tool to achieve his or her goals and not the sole means to lose weight.

"Any device will do as long as you use it correctly and effectively," he said. "However, no device will lose weight for you. It will help you plan, but you've got to follow through." 

★ ★ ★

*"...No device will lose weight for you. It will help you plan, but you've got to follow through."*

-DR. KONG CHEN

★ ★ ★

### NIH Body Weight Planner Helps Users Set Weight Goals

For those who would like to lose weight, but don't know where to start, the NIH Body Weight Planner might be a good place to begin.

Developed by NIDDK's Dr. Kevin Hall, the Body Weight Planner forecasts how body weight changes after people alter their diet and exercise habits. It takes into account what happens when people of varying weights and diet and exercise habits try to reduce their weight.

The planner asks for a person's height, weight and age. It also asks for his or her current physical activity level, what the goal weight is and the time frame for reaching the goal. Then, the planner calculates how many calories a person must eat to maintain current weight and reach and maintain the goal weight.

For information, see <https://www.supertracker.usda.gov/bwp/index.html>.



## Infertility Treatments Do Not Appear to Contribute to Developmental Delays in Children

Children conceived via infertility treatments are no more likely to have a developmental delay than children conceived without such treatments, according to a study by researchers at NIH, the New York state department of health and other institutions. The findings, published online in *JAMA Pediatrics*, may help to allay longstanding concerns that conception after infertility treatment could affect the embryo at a sensitive stage and result in lifelong disability.

The authors found no differences in developmental assessment scores of more than 1,800 children born to women who became pregnant after receiving infertility treatment and those of more than 4,000 children born to women who did not undergo such treatment.

“When we began our study, there was little research on the potential effects of conception via fertility treatments on U.S. children,” said Dr. Edwina Yeung, a population health researcher at NICHD. “Our results provide reassurance to the thousands of couples who have relied on these treatments to establish their families.”

Also taking part in the study were researchers from the University at Albany, N.Y., and CapitalCare Pediatrics in Troy, N.Y. The Upstate KIDS study enrolled infants born to women in New York state (except for New York City) from 2008 to 2010. Parents of infants whose birth certificates indicated infertility treatment were invited to enroll their children in the study, as were all parents of twins and other multiples. The researchers also recruited roughly three times as many singletons not conceived via infertility treatment.

Four months after giving birth, the mothers indicated on a questionnaire the type of infertility treatment they received. Parents also completed a questionnaire to screen children for developmental disabilities at numerous intervals throughout their children’s first 3 years of life: at 4-6, 8, 12, 18, 24 and 36 months of age. The questionnaire covered five main developmental areas, or domains: fine motor skills, gross motor skills, communication, personal and

social functioning and problem solving ability. Overall, children conceived via fertility treatments scored similarly to other children on the five areas covered in the developmental assessments.

## Speeding Up Brain’s Waste Disposal May Slow Down Neurodegenerative Diseases

A study of mice shows how proteasomes, a cell’s waste disposal system, may break down during Alzheimer’s disease, creating a cycle in which increased levels of damaged proteins become toxic, clog proteasomes and kill neurons. The study, published in *Nature Medicine* and supported by NIH, suggests that enhancing proteasome activity with drugs during the early stages



of Alzheimer’s may prevent dementia and reduce damage to the brain.

“This exciting research advances our understanding of the role of the proteasomes in neurodegeneration and provides a potential way to alleviate symptoms of neurodegenerative disorders,” said Dr. Roderick Corriveau, program director at NINDS, which provided funding for the study.

The proteasome is a hollow, cylindrical structure that chews up defective proteins into smaller pieces that can be recycled into new proteins needed by a cell. To understand how neurodegenerative disorders affect proteasomes, Dr. Natura Myeku, a postdoctoral fellow working with Dr. Karen E. Duff, professor of pathology and cell

biology at Columbia University, focused on tau, a structural protein that accumulates into clumps called tangles in the brain cells of patients with Alzheimer’s disease and several other neurodegenerative disorders known as tauopathies.

Using a genetically engineered mouse model of tauopathy, as well as looking at cells in a dish, the scientists discovered that as levels of abnormal tau increased, the proteasome activity slowed down.

## Scientists Manipulate Consciousness In Rats

Scientists showed that they could alter brain activity of rats and either wake them up or put them in an unconscious state by changing the firing rates of neurons in the central thalamus, a region known to regulate arousal. The study, published in *eLIFE*, was partially funded by NIH.

“Our results suggest the central thalamus works like a radio dial that tunes the brain to different states of activity and arousal,” said Dr. Jin Hyung Lee, assistant professor of neurology, neurosurgery and bioengineering at Stanford University and a senior author of the study.

Located deep inside the brain, the thalamus acts as a relay station sending neural signals from the body to the cortex. Damage to neurons in the central part of the thalamus may lead to problems with sleep,

attention and memory. Previous studies suggested that stimulation of thalamic neurons may awaken patients who have suffered a traumatic brain injury from minimally conscious states.

Lee’s team flashed laser pulses onto light sensitive central thalamic neurons of sleeping rats, which caused the cells to fire. High frequency stimulation of 40 or 100 pulses per second woke the rats. In contrast, low frequency stimulation of 10 pulses per second sent the rats into a state reminiscent of absence seizures that caused them to stiffen and stare before returning to sleep.

## Exec Sec's Brewer Retires

BY ERIC BOCK

Last January, Ann Brewer put a deck of playing cards on a table in her office to count down the weeks to her retirement. Each week she took one card from the deck.

"There are 52 cards in a deck and 52 weeks in a year, so I thought the cards would be a fun way to count down," she said.

On Dec. 31, Brewer retired as director of the Executive Secretariat (Exec Sec) in the Office of the Director.

Her office manages all written correspondence coming to and from the NIH director and principal deputy director. In 2014, she estimates her office handled 8,000 pieces of correspondence. Exec Sec also manages the official federal record of all documents signed by the director or deputy and other important documents related to NIH's mission.



**Once-a-month gig.** In one of her final performances as an NIH'er, newly retired Ann Brewer forfeits her lunch break to play traditional pop music and classical music on the Clinical Research Center's Steinway grand piano in the north atrium.

PHOTO: BILL BRANSON

but in hindsight it should've been," she said. "It is an incredible place."

She credits many of her colleagues with providing support and giving advice during

• • •

*"Working at NIH wasn't my first choice, but in hindsight it should've been. It is an incredible place."*

-ANN BREWER

• • •

Trained as a nurse, Brewer came to NIH in 2002. During her tenure, she has worked with four directors—two acting and two permanent. Before coming to NIH, she was the coordinator of female health at the Wisconsin department of corrections.

Brewer also plays the piano. In 1990, she began playing at the Wisconsin governor's mansion for special events. There, she met then-governor Tommy Thompson. After she performed, they would talk.

"I'd bend his ear, talking about health care issues that were important to me," Brewer said.

When Thompson became HHS secretary, he told her about an open position at NIH. She applied and got the job. At first, Brewer thought she would stay only for a few years and move back to Wisconsin. Like so many NIH'ers, she stayed longer than planned.

"Working at NIH wasn't my first choice,

different family members' illnesses. NIH is "an amazing place where everybody is willing to help out," she said.

Once a month, Brewer gave up her lunch break to play traditional pop music and classical music on the Clinical Research Center's Steinway grand piano in the north atrium for patients, staff and visitors. She's also proud to have sat on the board of directors of the Friends of Patients at the NIH.

She championed efforts to reduce Exec Sec's greenhouse gas emissions, energy and water consumption and pollution. In one year, she estimates that her staff has driven 100,000 fewer miles than they would have because of telework policies and flexible workplace agreements. Her efforts have also saved 200,000 pieces of paper.

After she sells her house on Capitol Hill, she'll return to Wisconsin to be closer to her 3 children and 4 grandchildren. Once

there, she plans to volunteer for advocacy work on behalf of families dealing with alcoholism and cheer for her two favorite football teams, the Green Bay Packers and the Wisconsin Badgers.

## NIAID Communicator London Calls It a Career, After 37 Years

BY CLAUDIA WAIR

Ann London is retiring after 37 years in public service. She began her career at HHS in 1978 at what was then the Alcohol, Drug Abuse and Mental Health Administration (now the Substance Abuse and Mental Health Services Administration). In that position she gained the editing skills that shaped her professional future.

She joined NIAID in May 1982 as an editorial assistant in the Laboratory of Immunoregulation, where she worked with its chief Dr. Anthony Fauci and other scientists. London loved being in the lab, working with the fellows and learning about their research and how it translated to Clinical Center patient wards. "Being a part of the energy in the early AIDS



Ann London, recently retired from NIAID, can now pursue her passion for travel full time.

era—before the disease was even named—made NIH research real,” she said. “It was hard leaving Bldg. 10.”

After Fauci became NIAID director in 1984, London moved to Bldg. 31. She was assigned to the Office of Communications, where she continued as his editorial assistant for a few months and began her writing career. She also handled public information calls—a stretch for an admitted introvert, but she enjoyed the opportunities to engage with the public, especially patients and their families and health care providers. “I listened to their questions and stories and helped them get correct information,” she said. “Having direct contact with the public helped me to write our publications to fit their needs. It was very fulfilling.”

As a public affairs specialist in the renamed Office of Communications and Public Liaison, she managed the NIAID exhibit and publications programs. Although she no longer handled public calls, she continued to write health and science publications for the public, often using feedback from health care professionals who visited the NIAID exhibit booth at conferences. Her work included determining the needs of the



*“Being a part of the energy in the early AIDS era—before the disease was even named—made NIH research real. It was hard leaving Bldg. 10.”*

—ANN LONDON



institute’s diverse audiences and ensuring NIAID communication products met those needs. Some of her publications received Blue Pencil and NIH plain language awards. For a time, she also handled requests as the NIAID Freedom of Information coordinator.

After working for much of her career in the print medium, in 2012, London joined NIAID’s New Media and Web Policy Branch, part of the Office of Communications and Government Relations, as a digital information specialist. There she worked on the institute’s

public web site and the intranet, not only editing content but also coding pages and optimizing web and social media content.

Throughout her career, she served on editorial, plain language and communications working groups and teams.

London looks forward to “decompressing” and to spending time with her three sons and daughters-in-law and grandson in the D.C. area, New York City and Los Angeles. She will continue to pursue her passions for helping people and for travel and the outdoors. She has visited 47 states and 20 countries. Future adventures include a long-anticipated trip to Denali National Park. Her favorite foreign destination is Italy, but always high on her travel list are her family’s roots—the Chesapeake Bay and the Blue Ridge Mountains.

Fauci was unable to attend London’s retirement party, but sent a video greeting “to express how grateful I am to you for your many years serving the institute...NIAID thanks you, NIH thanks you and the whole public health effort thanks you.”

## Remembering NICHD’s Rau

Dr. Donald Charles Rau, chief of NICHD’s macromolecular recognition and assembly section since 2002, passed away on Dec. 11 after a long battle with cancer.

Rau’s lab studies the forces, structure and dynamics of biologically important complexes to understand the macromolecules that control cellular functions. His work created a foundation for current and future generations of researchers to rationally design therapeutic agents that interfere with disease-associated complexes.

“We have lost a dear friend, a wonderful colleague and a great mentor,” said Dr. Joshua Zimmerberg, an associate scientific director at NICHD. “Don was a humble researcher who did amazing research during his 36 years at the NIH.”

Rau earned his undergraduate degree from the University of Illinois in 1968 and his Ph.D. in biochemistry and molecular biology from Harvard in 1975. He arrived at NIH in 1979 and stayed until he was no longer able to come to the lab. His observations and novel methods gave the world a unique perspective on biologically important recognition and assembly reactions, according to Zimmerberg.



Dr. Donald Charles Rau

Rau almost single-handedly advanced the fundamental understanding of intermolecular forces, DNA packing and the importance of water in DNA-protein recognition. Along the way, he developed several practical tools such as using osmotic stress to study the physical properties and kinetics of DNA-protein complexes. By 2008, Rau established that the DNA long-range attractive force has twice the exponential decay length of its short-range repulsion. By 2010, he determined the dependence of the force amplitudes on DNA-associated cation charge.

“He was a bench scientist guided by his brilliant mind, his fertile imagination and a deep understanding of physics and chemistry,” said Zimmerberg. “Most, if not all, of his papers include experimental data that he himself generated.”

Rau also was an expert on the fundamentals of DNA packing by protamines, which are small proteins found in the nucleus. He felt that exploring the controlled replacement of histones by protamines would be essential for understanding the role of and damage caused by defects in DNA packing.

Rau’s family organized a “Celebration of Don’s Life.” They request that any gifts in his memory go to the American Cancer Society, the Children’s Inn at NIH, the Foundation for the NIH or the NIH Clinical Center’s Patient Emergency Fund. **R**

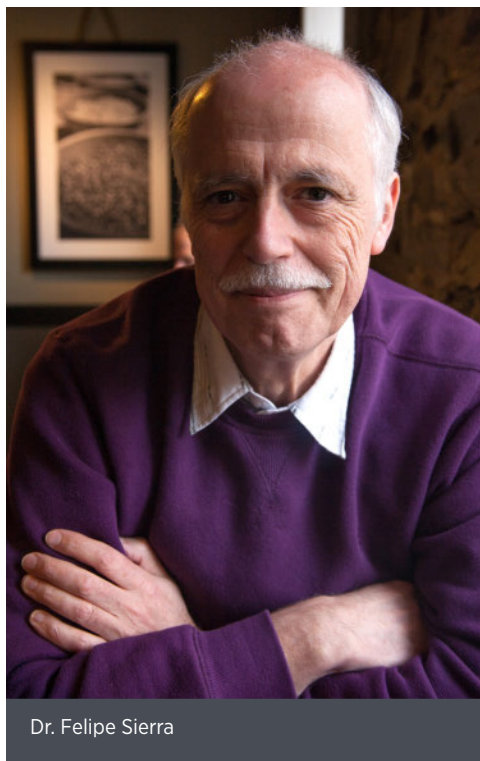
## NIA's Sierra Named 'Influencer' in Aging

*Next Avenue* has named the National Institute on Aging's Dr. Felipe Sierra as one of its top 50 Influencers in Aging in 2015. He is one of 10 people recognized in the area of health and well-being. *Next Avenue* is public media's national web-based service for America's 50+ population.

"This recognition reflects Felipe Sierra's commitment to improving our understanding of aging so that we may ultimately identify ways to have healthier, longer lives," said NIA director Dr. Richard Hodes. "It is well deserved."

Sierra has directed NIA's Division of Aging Biology since 2006. He oversees a diverse research portfolio that investigates the biological underpinnings of aging and possible methods to manipulate the aging process. The division, for instance, supported the research that identified the dominant cellular and molecular pathways currently believed to be the major pillars of aging, including inflammation, cell senescence, proteostasis, stem cells, stress resistance and others.

The division is also responsible for the




Dr. Felipe Sierra

Interventions Testing Program (ITP), a multi-institutional study designed to investigate compounds with the potential to extend lifespan and delay age-related disease and dysfunction. The ITP has

identified a number of compounds that extend lifespan and healthspan in genetically heterogeneous mice, including compounds in pre-clinical stages of research, such as rapamycin and acarbose.

Along with his work at NIA, Sierra has led NIH's venture in geroscience, a relatively new field that breaks down disciplinary silos in research to look at how common mechanisms in aging underlie the development of chronic diseases such as cancer, cardiovascular disease and diabetes. Sierra co-founded the trans-NIH geroscience interest group in 2011 and continues to coordinate it. He received an NIH Director's Award in 2013 and 2014 in recognition of this effort.

Influencers in Aging are selected by *Next Avenue* editors and contributors, as well as an advisory panel of experts in health, housing, work, media, philanthropy and gerontology.

"It is an honor to be identified as an Influencer in Aging," said Sierra. "My hope is that this distinction might introduce new people to the importance of aging biology and geroscience research and highlight how advances in these areas could help seniors lead healthier lives, free of debilitating chronic diseases."—Megan Homer 

## Effective Medicine Adherence Discussed in NINR Lecture

Dr. Jacqueline Dunbar-Jacob presented her work on patient medication adherence at 2015's second NINR Director's Lecture. Fellow scientists and health care professionals attended her talk, "Scientific Pursuit of Effective Medicine Adherence."

Dunbar-Jacob, distinguished service professor and dean of the School of Nursing at the University of Pittsburgh, was quick to point out that problems of adherence have existed since the time of Plato. However, with the rise of chronic conditions today—7 out of 10 deaths in the United States result from chronic disease—medication adherence has become a costly problem both monetarily and in regard to the quality of life for patients.

Dunbar-Jacob cited previous research where, of 100 patients given a prescription, 70–72 percent will fill it, 56 percent will refill it and only 28 percent will take the prescription correctly. Clearly, patient



Dr. Jacqueline Dunbar-Jacob (l) and Patricia Grady, NINR director

medication adherence is a "problem of significant magnitude." To address this problem, she proposed looking across studies to identify individual patterns that could lead to tailored interventions to improve adherence.

When exploring what poor adherence looks like, Dunbar-Jacob showed data from a group of patients who took about

70 percent of their medication doses. The data showed that behavior patterns varied greatly, even though the average adherence was the same. She also described the differences found when adherence was measured by self-report versus electronic event monitoring and other methods of measuring medication adherence. These differences led to the identification of various sociodemographic characteristics and baseline predictors of adherence even within the same population.

Summarizing data from her recent work, Dunbar-Jacob reiterated that, due to differences in measurement methods and identification of who adheres, the factors predicting adherence and the patterns of adherence vary greatly. She also emphasized the need for more research in medication adherence and expressed the need to include more diverse populations in future studies.

Dunbar-Jacob's lecture is available on NINR's YouTube channel at [https://youtu.be/G\\_-doIqQeR0](https://youtu.be/G_-doIqQeR0).—Lindsey O'Keefe