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R&R REDEFINED?

Training Retreat Offers Model For Teaching Research Skills

BY CARLA GARNETT

Usually when someone mentions getting a little “R&R,” thoughts of vacation come to mind. Now, though, rest and relaxation have a good reason to make room for “retreat and research.” That’s because a novel model for training early-career scientists has gained international attention—and applause—both from newbies as well as veterans in the research community.

At a recent Clinical Center Grand Rounds, Duke University’s Dr. Keith Sullivan presented “Academic Research Skills for the Physician-Scientist: From the Outer Banks



At CC Grand Rounds, longtime NIH grantee Dr. Keith Sullivan makes the case for a retreat-style training module.

to the Singapore Straits.”

The James B. Wyngaarden professor of medicine in the division of cellular therapy

at Duke University Medical Center, Sullivan, who is also an NIH grantee supported by NCI, NHLBI and NIAID for more than 40 years, described a different kind of educational venue he and colleagues developed almost two decades ago to address gaps in traditional instruction.

“It’s not part of the repertoire of research institutions,” he explained, “to train individuals in those skill sets—writing, grants and protocol development—but more importantly, is this what you want to do in life? Is this what your family wants to do in life? And how can you be successful in that endeavor?”

Curriculum essentials—clinical trial design, bioethics, biostatistical analysis, grant writing, manuscript preparation—are well-established subjects for those headed into academic medicine and science, said Dr. Robert Lembo, deputy director of the Office of Clinical Research Training and Medical Education, who introduced the lecture.

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OMB comes calling, tours CC. See p. 4 for more.

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Citizen Scientists Are Advancing NIH's Mission

BY ERIC BOCK

Engaging the public directly in the scientific research process, also known as “citizen science,” can yield better data and new insights. That was the take-home message at the “Engaging Citizen Scientists to Advance Biomedical Research” symposium held in Bldg. 45 recently.

The symposium, sponsored by NCI’s Division of Cancer Biology, showcased citizen scientist success stories in the biomedical world. The



Amy Sterling,
executive director of
EyeWire

Two NCI Scientists Win 2017 Lasker Award

Beginning their partnership as bench researchers in the 1980s, Dr. Doug Lowy and Dr. John T. Schiller have worked together at the National Cancer Institute for more than 30 years. Three decades, more than 150 co-authored papers and hundreds of thousands of prevented cancers later, the pair have received one of the most prestigious scientific achievement awards in the world—a Lasker.

They received the 2017 Lasker-DeBakey Clinical Medical Research Award on Sept. 15 in recognition of research that led to the development of the human papillomavirus (HPV) vaccine. Often referred to as “America’s Nobel,” the Lasker is the nation’s highest honor for biomedical research and one of the most renowned scientific awards in the world.

The road to this award started in the 1990s, when Lowy and Schiller began

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SEE LASKER, PAGE 4

APAO Solicits Award Nominations

The NIH Asian & Pacific Islander American Organization (APAO) will continue its tradition of honoring employees in the NIH Asian Pacific American community for their achievements.

Nominations are being solicited for four categories through Monday, Oct. 23. Categories are Scientific Achievement Award—for scientists/researchers who have made significant accomplishments in biomedical research; Leadership Excellence Award—for non-scientists and scientists who exemplify leadership excellence by example, mentorship and empowerment of Asian and Pacific Americans to promote diversity and support the overall mission of NIH; and Young Investigator Award—to recognize achievements by visiting, clinical and research fellows who have spent less than 7 years at NIH. A fourth category, Kuan-Teh Jeang Distinguished Service Award, recognizes an APAO member who has made an outstanding contribution or demonstrated continual high-quality service to the NIH Asian Pacific American community.

Nominees must work or have previously worked (within the past year) at NIH. Awardees will be honored at the APAO awards ceremony on Dec. 6 in Wilson Hall, Bldg. 1.

Submit a 1-page narrative/statement to support why you think an individual deserves recognition and include a CV of the nominee. You may nominate different individuals for the appropriate award category. A review committee composed of members from the APAO and non-members representing several institutes and centers, as well as former award recipients, will evaluate all nominations. Submit nominations electronically no later than Oct. 23 to Dr. Shioko Kimura, awards committee chair, at kimuras@mail.nih.gov. For details, ask for the 2-page award nomination manual.



NIMHD Hosts 2nd Health Disparities Institute

The National Institute on Minority Health and Health Disparities held its second annual Health Disparities Research Institute at NIH Aug. 14-18. This year's cohort included 54 scholars, with disciplines ranging from M.D. and Ph.D. to R.N. and Psy.D.



Outdoor Film Festival Draws Crowds, Benefits Kids

The 21st Comcast Outdoor Film Festival benefitting the NIH Children's Charities took place Aug. 24-26 at Strathmore, drawing some 9,500 patrons and raising more than \$6,500.

The biggest attraction was *Moana*, shown on the first night. More than 3,500 people stretched out on the lawn, enjoying burgers, dogs, popcorn, candy and ice cream.

The other films drawing date-night attention were *The LEGO Batman Movie* and *Rogue One: A Star Wars Story*.

PHOTOS: JIM SAAH



Goodarzi Uses Math, RNA Biology to Counter Metastasis

When a person dies of cancer, it's usually not the primary tumor that causes death. It's the metastases, which use the bloodstream as a highway to spread trouble body-wide. Figure out how to arrest these nomadic wanderings and you may go far to limit cancer's damage.

Dr. Hani Goodarzi, an assistant professor at the University of California, San Francisco, is using his expertise as both a computational and an RNA biologist to investigate ways of thwarting metastases. His work earned him the 2017 Martin and Rose Wachtel Cancer Research Award presented by the American Association for the Advancement of Science. NCI's Center for Cancer Research co-hosted the award lecture, given recently in Lipsett Amphitheater.

Goodarzi and colleagues are focusing on a mouse model of breast cancer, comparing



Goodarzi (c) is flanked by Dr. Tom Misteli (l) of NCI and by former NIGMS director Dr. Jeremy Berg, now editor-in-chief of the *Science* family of journals.



Dr. Hani Goodarzi speaks in Lipsett Amphitheater.

PHOTOS: CHIA-CHI CHARLIE CHANG

the gene expression profiles of tumors that have low metastatic activity versus those with high metastatic activity. What makes them different and what drives metastasis?

• • •

"These are really amazing times to be an RNA biologist and a computational biologist."

-DR. HANI GOODARZI

• • •

Disordered gene expression is the root of both cancer and subsequent metastasis, he explained.

His laboratory has built a platform that measures RNA stability, with the hope of identifying elements that promote the broad destabilization that characterizes tumor development.

Called TEISER, the platform can identify structural elements or "seeds" that could be involved in the spread of cancer; there are about 100 million of them, making the research team reliant on cluster and high-performance computing to winnow drivers from mere passengers.

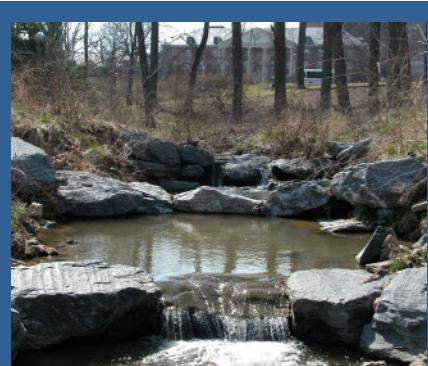
Goodarzi's lab has teased out what they call the sRSE, or structural RNA stability element (also called a regulon), but what regulates the regulon?

Over-expression of the TARBP2 gene has been tied to RNA destabilization and appears to be a factor in distinguishing highly metastatic tumors from less active ones. TARBP2 promotes breast cancer metastasis, targeting four transcripts involved in that process.

"These are really amazing times to be an RNA biologist and a computational biologist," said Goodarzi.

His award was presented by former NIGMS director Dr. Jeremy Berg, who is now editor-in-chief of the *Science* family of journals; *Science* is the flagship journal of the AAAS.

Dr. Tom Misteli, director of the Center for Cancer Research, said that the Wachtel Award, now in its 5th year, is getting better every year, with a higher bar set for achieving the honor each year. The award is for early-career investigators, who, Misteli quipped, tend to often produce the most creative work (he acknowledged winces from older scientists in the audience). Misteli encouraged NIH tenure-track investigators to apply early.—Rich McManus R



ON THE COVER: View of a waterfall in the creek bed in front of Bldg. 1

IMAGE: BELLE WARING, CIRCA 2008

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National Institutes of Health
Turning Discovery Into Health



NCI's Dr. John T. Schiller (l) and Dr. Doug Lowy have been scientific collaborators for decades. Their work has saved many people from cancer, world-wide.

Lasker

CONTINUED FROM PAGE 1

investigating ways to prevent cancers caused by HPV. Ten years earlier, Dr. Harold zur Hausen and his team discovered that infection with certain types of HPV causes almost all cases of cervical cancer—the fourth most common cancer in women worldwide. Each year, more than 500,000 women around the world are diagnosed with cervical cancer and more than 275,000 women die from the disease. HPV infection was also found to cause anal, vulvar, vaginal, penile and oropharyngeal cancers.

Building on zur Hausen's work, Schiller and Lowy discovered that the proteins that form the outer shell of HPV could form virus-like particles (VLPs) that closely resemble the original virus but are not infectious or oncogenic. They found that VLPs could trigger the immune system to produce high levels

of protective antibodies that can neutralize the virus in a subsequent infection. The VLPs ultimately became the basis of the three current HPV vaccines: Gardasil, Gardasil 9 and Cervarix.

The vaccine is a public health triumph and has the potential to eliminate cervical cancer and other HPV-associated cancers as a major public health problem. However, moving this discovery from the laboratory to a commercial vaccine had its challenges; realizing its potential will require concerted

efforts to increase vaccine uptake, particularly in low- and middle-income countries where most HPV-associated cancers occur.

"The vaccine manufacturers took a considerable risk in their role in developing the vaccine," said Lowy. "Before the HPV vaccine, there was no vaccine that could prevent benign and malignant disease that develops at the initial site of infection. Fortunately for everyone, the ability of the commercial vaccines to prevent disease caused by HPV has exceeded even our most optimistic expectations."

The vaccine also highlights the importance of basic research in the development of medical breakthroughs.

"Basic discovery is the engine of translational research," said Schiller. "Virtually every single one of the major advances in modern biomedicine are based on fundamental discoveries. It's not clear which basic discoveries are going to lead to which medical breakthroughs. Although we're receiving this award, it really is an award that should go to the whole community of brilliant and hardworking NCI, academic and industry scientists. Without all of their efforts, we wouldn't have this vaccine." R

OMB Officials Visit Campus

Joe Grogan, associate director for health programs at the Office of Management and Budget, and several other OMB officials paid a call on NIH July 17 for a conversation with leadership and a lab tour.

Among the guests were Rob Pyron, assistant to Grogan; Marcus Nonvillain, associate director at the National Economic Council; Rebekah Armstrong, special assistant to the vice president; Christine Farquharson, program examiner in OMB's Public Health Branch; Mary Sumpter-Lapinski, counselor to HHS Secretary Tom Price; and Jen Moughalian, HHS acting assistant secretary for financial resources.

They were met by a number of NIH senior leaders including NIH director Dr. Francis Collins, principal deputy director Dr. Lawrence Tabak, Associate Director for Budget Neil Shapiro, acting chief of staff Dr. Carrie Wolinetz, NIAID director Dr. Anthony Fauci, Clinical Center CEO Dr. James Gilman, NIAMS director Dr. Stephen Katz, NIDDK director Dr. Griffin Rodgers and NIDA director Dr. Nora Volkow.

The group met for about an hour in the medical board room before visiting NCI Surgery Branch chief Dr. Steven Rosenberg in his office and lab.



At left, OMB officials tour the special clinical studies unit with Dr. Richard Davey (c). At right, NIAMS director Dr. Stephen Katz (r) greets Joe Grogan of OMB. Below, NIAID director Dr. Anthony Fauci (l) discusses infectious disease research with (from l) Davey, Dr. Henry Masur, Dr. Clifford Lane and Grogan.

PHOTOS: CHIA-CHI CHARLIE CHANG

They also met briefly with one of Rosenberg's patients.

Final stop for the group was the special clinical studies unit, which treats people with conditions that require a high level of isolation. Fauci gave an overview of the unit and SCSU chief Dr. Richard Davey conducted a room tour.





NIH cafeterias will serve gourmet salmon tacos starting the week of Sept. 25-29 and then every sixth week thereafter.

PHOTO: SAVINA SPARKER/EUREST

Heart-Healthy Fish Tacos Come to NIH Cafes, Courtesy of NHLBI

Get your taste buds ready: NIH cafeterias will serve gourmet salmon tacos starting the week of Sept. 25-29 and then every sixth week thereafter. And if this doesn't get your fins flapping, here's something that might: The taco recipe comes from an online heart-healthy cookbook available from NHLBI.

Called the Baja-style salmon taco, the trendy treat will be served at grilling stations in the cafeterias of Bldgs. 10 (second floor), 35 and 31. The taco is spiced with jalapeno, chili powder and red onion and prepared with corn tortillas and fresh salmon, making it high in flavor and protein and low in saturated fat.

"We're always pushing the envelope to try new things and bring delicious and nutritious items to the cafeteria," said Savina Sparker, wellness manager and a registered dietitian with Eurest, the company that runs several NIH cafeterias. "We're thrilled to work with NHLBI and to continue a collaboration that we've had in previous events, like Wear Red Day and American Heart Month."

This is not the first time the cafeterias have used a recipe from NHLBI's heart-healthy cookbook. Since February, salad bars have included a quinoa and black bean salad that has been popular among customers.

In addition to the fish tacos and quinoa salad, the cookbook includes more than 100 recipes designed to help keep heart disease at bay. To see the recipes, visit <https://healthyeating.nhlbi.nih.gov/>.

LOCAL HERO

NIH Police Officer Pulls Driver from Burning Car

When Cpl. Kyle McKee of the NIH Police saw the burning car, he knew he had to do whatever it took to save the driver's life.

On July 1, McKee was driving home from work at Ft. Detrick on the Baltimore Beltway. At about 2:20 a.m., a Lexus sedan crashed head-on into a concrete wall. The car bounced off the wall, came to a stop in the road and burst into flames.

"Without regard to his personal safety, Cpl. McKee extended the life of a helpless and unresponsive driver of a car engulfed in flames," said NIH Police Chief Alvin Hinton. "He deserves recognition for valiantly extending the life of another human being, while risking his own."

McKee pulled over after he saw the accident, as did another man who was filming the wreckage. He called 911 and went over to help the driver to safety. All he could think was: "How do I get to the car fire, get the driver out and away from the car and keep him alive?"

The doors were locked, the windows were up and the driver was slumped over the steering wheel unresponsive, despite the officer's attempts to get his attention. McKee's training took over.

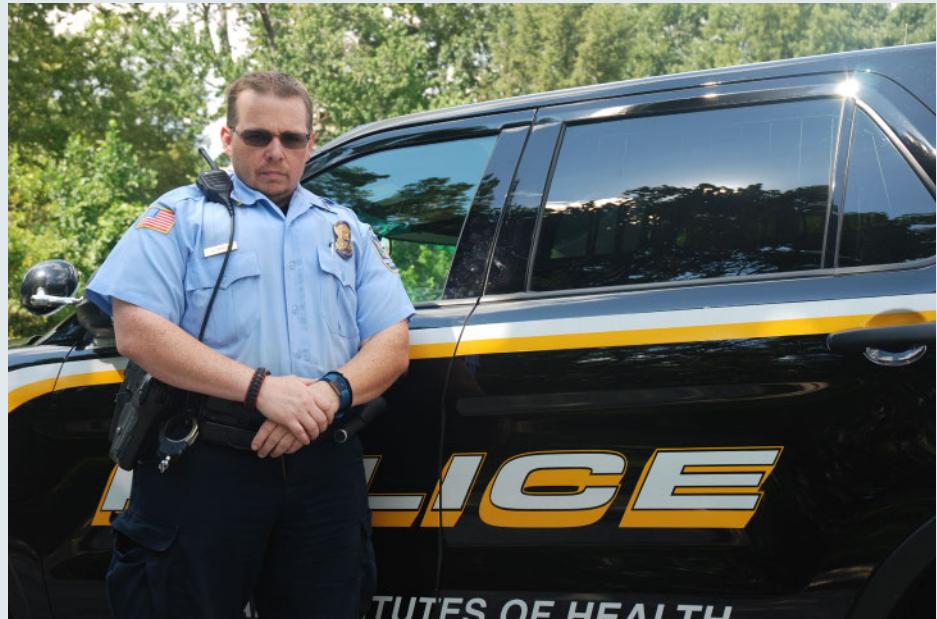
He broke the car's window with a utility knife and unlocked the doors. He tried to pull the man to safety. However, McKee had trouble getting the man out. At this point, the man filming put down his camera and started to help. McKee went around to the front passenger's side, unbuckled the driver's seatbelt and pushed him out while the other man pulled the driver from the other side.

As soon as the driver was out, McKee tried to get out. But the door wouldn't budge and the car filled up with smoke. He kept his wits, climbed over the vehicle's console and jumped through the driver's door. He dragged the man 200 feet away from the accident as the fire spread.

Once Maryland State Police and medical personnel showed up—the "cavalry" as he calls them—McKee called his police dispatcher to explain what happened, filed a report and went home.

McKee has had to make split-second decisions before. Prior to joining NIH, he worked for the Department of Homeland Security. He assisted with the Federal Emergency Management Agency's efforts to rebuild New Orleans and other areas on the Gulf Coast for almost 7 months as the region recovered from Hurricane Katrina.

"When you're running into a dangerous situation, you're not thinking about yourself," he said. "You're focused on getting the person in danger out of danger."—Eric Bock



Cpl. Kyle McKee risked his life recently to save the driver of a crashed car.

PHOTO: ERIC BOCK



At left, Dr. Robert Lembo introduces Sullivan. At right, NCI's Dr. Steven Pavletic (l, middle row) took part in the retreat in 2016.

LECTURE PHOTOS: ANDREW PROPP

Retreat

CONTINUED FROM PAGE 1

"While there's general agreement among educators on content," he said, "there is no consensus on a standardized pedagogical approach to the development of research skills within the postgraduate medical education community."

Beyond Basic Training

In 2001, Sullivan and several Duke collaborators designed a multi-dimensional model—the Southeastern Fellows Research Skills Retreat and Training Workshop—to teach not only the prerequisites, but also the intangibles of pursuing the ideal life of say, an M.D./Ph.D.

Over 2½ days, faculty gathers with fellows and their families to discuss many concepts and concerns not covered in most postgraduate educational settings.

"What are the components and challenges of a successful career in academic research?" asked Sullivan. It's what most fellows want to know and what most veterans in the field want to share. "What are the skills [needed] to help that career along and how can these skills be applied by you to your current trainees?"

In developing the model, Sullivan said retreat designers considered several key factors about medical research:

First, its undeniable practical value to society. Sullivan showed slides on the decline of heart disease-related deaths over the last half century as well as evidence that progress against cancer is also growing—"Proof," he said, "that basic science and discovery have direct application for the health of the nation."

Next, he showed a bell curve charting the age distribution of great innovation, which seems to peak around the late 30s to early 40s.

"This is something [young trainees] consider quickly because the clock is ticking," Sullivan said.

New researchers also may look at grant funding, its "continued stringency" over the past 20 years and potential scarcity in future years. In addition, he said, the average trainee is about \$200,000-\$300,000 in debt

after completing M.D. or Ph.D. programs.

Finally, the seasoned academic thought leaders factored in the value of family and community connections and what had been worthwhile in their own scientific careers and personal lives.

"This is the reason we decided to launch an antidote, inviting the family, inviting the children to a high-end resort where we

can sequester the fellows in a lovely place—on a ribbon of sand between the Atlantic Ocean and Currituck Sound in the upper Outer Banks of North Carolina," Sullivan said.

Concept Catches On

The annual retreat started small—choosing a location, the Sanderling Inn in Duck, N.C., within a few hours driving

'TEACHERS ARE STUDENTS...STUDENTS ARE TEACHERS'

Past Attendees Laud Retreat Experience

NCI's Dr. Steven Pavletic has first-hand experience with the Southeastern Fellows Research Skills and Training Workshop. Senior clinician and head of the graft-versus-host and autoimmunity section in the Experimental Transplantation and Immunology Branch, he attended as faculty in 2016.

"My assigned roles were to lead two small working groups in sessions on clinical protocols and grant writing," he said. "In addition, I was asked to give a short TED-like talk on leadership in the session on academic career development. This latter was particularly enjoyable since it forced me to succinctly reflect on what I currently do, how I got here and what I could teach the next generation of physicians on academic life. I also taught them about unique opportunities in the NIH intramural program for those pursuing research careers, since it is not so widely known."

"The main impression I took from this course is the reinforcement in the conviction about the old saying that 'Teachers are students and students are teachers.' The main differences between me and my students are only time and experience. Teaching and learning are truly two-way roads. Trying to convey a little piece of what we have learned to help navigate better through the increasing challenges of the academic

clinical research is what this course is all about. The summary impressions of this outstanding and unique course are simple: I wish that somebody had delivered something like this to me when I was at that stage and I am immensely grateful for this opportunity to have attended...Dr. Keith Sullivan and Duke University should be commended for launching this course 17 years ago."

NCI's Dr. Hoyoung Maeng and Dr. Kathryn Lurain were trainees together at the retreat earlier this year.

"It is a valuable experience that the fellows get connected with other institution fellows—juniors and seniors—and have the chance to ask about the things that we did not have opportunities to ask with daily busy training," recalled Maeng, staff clinician in the Vaccine Branch of the Center for Cancer Research. "It was protected learning time also with some relaxed time to enjoy the family on the beach."

In relation to her NCI fellowship, she also mentioned mutual benefits gained by trainees and faculty. "I felt very proud that we were more experienced than anyone over there—including some faculty—in terms of clinical protocols, since we see solely clinical trial patients," Maeng said. "There are pros and cons for seeing the trial patients, but for me it served the purpose of coming here and it was great to share my experience at the fellows level with other trainees from other institutions. I am very grateful for the opportunity...and hope it continues."

distance—with just the 15 or so fellows in Duke's hematology/oncology program. Then, the module expanded to the University of North Carolina and Wake Forest and moved into cardiology and other subspecialties and surgery.

By 2009, a dozen institutions within driving radius, including NIH, had signed onto the approach. In recent years, the retreat has reached the inn's maximum capacity, 140—up to 50 fellows and their families plus 20 faculty members. Since the beginning, just under 600 individuals have come through the retreat.

"There have been several instances where future collaborations, friendships formed [during a retreat]—understanding other people's research—have had downstream benefits," Sullivan reported.

The intensive training—non-retreat calls, texts and emails are strongly discouraged—begins with a focus on writing for scientists.

"This is one thing that really isn't taught at institutions," Sullivan pointed out, "and

yet you and I as reviewers of manuscripts go crazy when we can't figure out what the author is trying to tell us."

Voices of Experience Speak

Other frequently unaddressed concerns that the retreat tackles include: How do I manage my time and work-family balance? How do I transition successfully from fellow to faculty?

In a unique twist, trainers conduct "concurrent sessions with spouses to explain what life is like for the academic career family," explained Sullivan.

In addition, fellows engage in small group grant/protocol study sections—"This is the first time that almost all of the fellows have ever looked behind the curtain to see how an NIH scoring session works; they get to ask, 'How can I be competitive against all those other applications?'" Sullivan noted—and open mic sessions for real-life storytelling across the career spectrum, from freshmen to senior researchers.



Earlier this year, Sullivan (r) as well as NCI's Dr. Hoyoung Maeng and Dr. Kathryn Lurain gather with other retreat participants for the group shot.

Chief fellow in the combined NCI/NHLBI Hematology/Oncology Fellowship, Lurain agreed, "I would echo Hoyoung's sentiments. I found being able to spend time in a dedicated setting with successful faculty, young and old, to be incredibly helpful and inspiring to my own career. The grant-writing workshop was also especially helpful as this is not something we get a tremendous amount of practice with at the NIH, but is fundamental to a successful academic career outside the intramural program. And it wasn't half bad getting to hang out with my family and Hoyoung in a beautiful setting."

Finally, Pavletic also had a message "for the future organizers of this and similar courses. This course teaches the new researchers also about resilience and tenacity, which are indispensable character

ingredients in these days of greatest need for a larger clinical researcher work force. Such courses and the medical schools must adjust their curricula to build new leaders [that] the future of medicine needs. Besides the indispensable outstanding training in medical care, they need also to acquire skills and awareness on how to manage and lead large teams and complexes in academia, industry, government, health care and finance.

"Doctors are, by definition, very busy but we need to find ways to reclaim our profession and develop the new generation of clinicians-scientists who will be able to exert their roles as the leaders of the future. Such courses as this at Duke provide an indispensable and empowering tool."

Other components discuss trial design and statistics, joining/starting a lab and negotiation and managing conflict.

"Universities are great at doing this—ethical principles, trial basics and regulatory realities," Sullivan admitted, "but it's the downstream stuff that really is important—how to analyze the data and put the paper together—that are not always well taught."

There's even a 3-hour "course assimilation" period, held picnic-style at the shoreline amid sand and surf with fellows and their families. At first it was simply labeled "beach time," but one financial sponsor balked at what was perceived to be a "frivolous thing" on the agenda. Planners, however, doubled down, stressing the importance of building and maintaining strong interpersonal relationships for healthy and productive physician-scientists. Organizers fought for the built-in social/recreational module, eventually renaming it.

"It's not frivolous," Sullivan argued, "because this is the time in a beautiful setting with your family that you have emotion and that binds and bonds into long-term memory what you've learned in the course."

Elements of Success

In 2016, Sullivan and company were asked to bring their retreat model overseas, to the National University of Singapore. The program there, now past its second season, involves not only clinician-scientists in the fellow stage, but also several at the associate and assistant professor levels. The Singapore group reported more successful [RO1-equivalent] grant applications than ever.

"Success in an academic research career is rewarding but challenging," concluded Sullivan. "Career development skills are often neglected in institution training programs...Whether in the Far East or Southeast, problems are similar for trainees and junior faculty. Faculty participation in focused guidance programs and mentorship remains key to career success for our physician-scientists."

"Success isn't just what you accomplish in your life," he ended, emphasizing a sentiment shared by the Singapore coordinator to sum up the retreat experience, "it's about what you inspire others to do." **R**



Panelists (from l) NCI's Dr. Jennifer Couch, Dr. Nikhil Wagle, Melissa Martin and Dr. Corrie Painter

PHOTOS: CHIA-CHI CHARLIE CHANG

Citizen Scientists

CONTINUED FROM PAGE 1

NIH citizen science working group put on the event.

"We get data we wouldn't have otherwise and we get the insights and context that come along with that data," said Dr. Jennifer Couch, chief of the Structural Biology and Molecular Applications Branch in NCI's Division of Cancer Biology and co-chair of the working group, during opening remarks. "We also benefit from the creativity, innovation and problem-solving skills of the public."

First, Amy Sterling spoke about her experience as executive director of EyeWire, an online game that challenges players to map the 3-D structure of neurons in the retina of a mouse. Melissa Martin, an EyeWire gamer, spoke about why she plays.

There are 200,000 players from 150 countries. As they map neurons, they accrue points based on speed and accuracy. Traditionally, it takes one neuroscientist dozens of hours to map one neuron. But EyeWire players such as Martin have made the process go much faster.

"This is my way of unwinding," Martin said. "Before I started playing this game, I came home and I would turn on the flickering box also known as the TV and I would sit and I'd just stare at that. This is a good way to contribute to something instead of just sitting there."

Dr. Nikhil Wagle and Dr. Corrie Painter of Dana-Farber Cancer Institute and the Broad Institute of MIT and Harvard spoke about the Metastatic Breast Cancer Project, an initiative where patients with breast cancer that has spread to other organs in the body agree to share their medical records and tissue samples with the research study.

So far, more than 3,700 patients have signed up and 2,100 have signed a consent

that allows the project to obtain and analyze their medical records and tissue and saliva samples.

During the project's design, Wagle and Painter sought the input of patients and advocacy groups around the country. They also advertised on the internet and observed that many patients posted on social media about their participation without prompting. Enrollment always increased soon after the social media posts.

"The patient-driven outreach, both online and in person, has been really remarkable and perhaps the most rewarding and powerful part of this project," said Wagle, leader of the project and a breast cancer oncologist and metastatic breast cancer researcher.

A survivor of a rare cancer of the blood vessels called angiosarcoma, Painter became director of the project because she believed it was an opportunity "to come and think out of the box, where you could engage people with cancers in order to greatly accelerate the pace of research."

Dave Micklos, executive director of the DNA Learning Center at Cold Spring Harbor



Dave Micklos of the DNA Learning Center

Laboratory, chronicled efforts to introduce students from Brooklyn, Queens and Long Island to DNA barcoding, a taxonomy method that uses DNA to identify organisms. Students find flora and fauna in local parks, collect DNA samples and send them to a lab for sequencing for a program called Barcode Long Island.

One of the students who participated is Elizabeth Scianno, a rising senior at William Floyd High School in Suffolk, N.Y. She and two other students have studied the bacteria that potentially causes die-off of a type of sea grass called Zostera, which provides critical habitat for fish and crabs. The three recently presented their findings at a poster session.

"Even though there were several challenges—even staying past 8 p.m. at school—I think it was definitely all worth it," she said.

Later in the day, representatives from four other federal agencies described their programs and dispelled several key myths about citizen science.

Jay Benforado, chief innovation officer in the Environmental Protection Agency's Office of Research and Development, said there are three myths about citizen science projects: statutes, rules and regulations prevent the funding of projects; the data collected from these projects is bad; and the tools required to conduct experiments are too expensive.

The EPA, he said, has worked with the Office of Management and Budget to fast-track projects and fund competitions. Kayakers and boaters have taken photos of algae around the country and reported reliably back to the agency. He added that technological advances have brought the cost

of many devices down significantly so citizen scientists can use them.

Dr. Sophia B. Liu, an innovation specialist at the U.S. Geological Survey Science and Decisions Center, said using data compiled by citizen scientists isn't new. Since 1997, USGS has been asking members of the public who feel an earthquake to fill out an online questionnaire. The USGS also has a Tweet

Earthquake Dispatch project that searches Twitter data to detect earthquakes.

"About 90 percent of our Twitter detections are faster than our seismic stations," she explained.

John McLaughlin, a program manager in the National Oceanic and Atmospheric Administration's Office of Education, said NOAA supports at least 60 citizen science projects. In one, 20,000 members of the public from around the country measure rainfall and report back to the agency. In another, 6,000 California students monitor

life in the intertidal zone—the area between low and high tide—at national marine sanctuaries.

"Citizen science is a great way for students to do authentic science projects, participate in the scientific process and learn," he said.

Tammy White, senior communications and IT platform specialist at the General Services Administration, said there are ways the public can participate in scientific projects, whether it's observing, monitoring, transcribing, mapping, photographing

or editing. She works on the www.citizenscience.gov and www.challenge.gov initiatives, where she advises other agencies interested in connecting with people who "have really good ideas," but aren't familiar with the government.

In conclusion, Couch said there's a culture of innovation and creativity out there. People are smart, clever and creative. If those talents can be tapped into, "they can and will help us solve complicated biomedical questions." **R**

Flu Vaccine Clinic for NIH'ers Begins Oct. 2

The Office of Research Services and the Clinical Center will provide free flu shots to staff with a valid NIH identification badge from Oct. 2 through Nov. 9.

Getting immunized each year provides the best protection against influenza throughout flu season. By getting the flu shot, health care personnel can also reduce the risk of exposing patients to the influenza virus. All staff who have patient contact, including employees and contractors, are required to get the flu vaccine each year. For all other NIH staff, immunization with the flu vaccine is encouraged, but not required.

Opening early in the morning, the flu clinic will be located on the east side of the 7th floor of the Clinical Research Center. Starting Oct. 11, there will also be off-campus sites providing free flu shots. Shady Grove, Bayview, Poolesville, Neuroscience Center, Fishers Lane and Rockledge locations are included on the schedule.

There are several clinics offered for those who work nights and weekends. Clinic hours are scheduled on early mornings, evenings and Saturdays at the CRC 7th Floor Atrium. Visit www.ors.od.nih.gov/flu/Pages/vaccine_sched.aspx for specific dates, times and directions.

The vaccine is administered in the upper arm, so wear short sleeves or clothing that allows for easy exposure of your upper arm/shoulder.

If you would like the high-dose flu vaccine for workers who are 65 or older, just notify the nurse. To learn more about the high-dose flu shot, visit <http://go.usa.gov/PAUY>.

It takes about 2 weeks after immunization for antibodies to develop and provide protection against influenza virus infection. In the meantime, you are still at risk for getting the flu. That's why it's better to get immunized early in the fall, before the flu season really gets under way.

For more information, visit foiletheflu.nih.gov or call (301) 496-2209.

MAIN CAMPUS SITE				
Date	Day	Location	Morning	Afternoon/Evening
10/02/17	Monday	10-CRC ¹	8:00 – Noon	Noon – 3:30
10/03/17	Tuesday	10-CRC	8:00 – Noon	Noon – 3:30
10/04/17	Wednesday	10-CRC	8:00 – Noon	Noon – 3:30
10/05/17	Thursday	10-CRC	6:00 – Noon	Noon – 7:00
10/06/17	Friday	10-CRC	8:00 – Noon	Noon – 3:30
10/09/17	Monday	10-CRC	Closed	Closed
10/10/17	Tuesday	10-CRC	8:00 – 11:30	12:30 – 3:30
10/13/17	Friday	10-CRC	8:00 – 11:30	12:30 – 3:30
10/24/17	Tuesday	10-CRC	8:30 – Noon	Noon – 3:00
10/25/17	Wednesday	10-CRC	8:30 – Noon	Noon – 3:00
10/26/17	Thursday	10-CRC	8:30 – Noon	Noon – 3:00
10/27/17	Friday	10-CRC	8:30 – 11:30	12:30 – 3:00
10/30/17	Monday	10-CRC	8:00 – 11:30	12:30 – 3:30
10/31/17	Tuesday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/01/17	Wednesday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/02/17	Thursday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/03/17	Friday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/06/17	Monday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/07/17	Tuesday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/08/17	Wednesday	10-CRC	6:00 – 11:30	12:30 – 7:00
11/09/17	Thursday	10-CRC	8:00 – 11:30	12:30 – 3:30
11/10/17	Friday	10-CRC	Closed	Closed

WEEKEND HOURS (10-CRC) - SATURDAY 11/04/17

Open to All Employees • 6:30am - 8:00am and 6:30pm - 8:00pm

OFF CAMPUS SITES				
Date	Day	Location	Morning	Afternoon/Evening
10/11/17	Wednesday	Shady Grove ⁷	8:30 – Noon	Noon – 3:00
10/12/17	Thursday	Shady Grove	8:30 – Noon	Noon – 3:00
10/12/17	Thursday	BRC ²	8:30 – Noon	Noon – 3:30
10/13/17	Friday	BRC	8:30 – 11:30	Harbor Hospital 1:00 – 2:00
10/16/17	Monday	Fishers Lane ³	8:30 – Noon	Noon – 3:00
10/17/17	Tuesday	Fishers Lane	8:30 – Noon	Noon – 3:00
10/18/17	Wednesday	RKL ⁶	8:30 – Noon	Noon – 3:00
10/18/17	Wednesday	Poolesville ⁵	8:30 – 11:00	11:30 – 2:00
10/19/17	Thursday	RKL	8:30 – Noon	Noon – 3:00
10/20/17	Friday	NSC ⁴	8:30 – 11:30	12:30 – 3:30
10/23/17	Monday	NSC	8:30 – Noon	Noon – 3:00

For questions, please contact OMS at 301-496-4411.

¹Main Campus:
Building 10, CRC 7th Floor Atrium, East Side

²BRC: 251 Bayview Boulevard, Baltimore, MD
3rd Floor Atrium Lobby

³Fishers Lane: 5601 Fishers Lane, Rockville, MD
Rooms LD 20 A&B

⁴NSC: 6001 Executive Boulevard 1st Floor Room D&E

⁵Poolesville: Building 103 (am)/ Building 112 (pm)

⁶RKL: 6701 Rockledge Drive, Bethesda, MD - Room 6191

⁷Shady Grove: 9609 Medical Center Drive, Rockville, MD – Room TE406 - Terrace Level East Tower

Robotic Exoskeleton Offers Approach to Alleviate Crouch Gait in Kids with Cerebral Palsy

Researchers from the Clinical Center's rehabilitation medicine department have created the first robotic exoskeleton specifically designed to treat crouch (or flexed-knee) gait in children with cerebral palsy by providing powered knee extension assistance at key points during the walking cycle.



Crouch gait, the excessive bending of the knees while walking, is a common and debilitating condition in children with cerebral palsy. Despite conventional treatments (including muscle injections, surgery, physical therapy and orthotics), crouch gait can lead to a progressive degeneration of the walking function, ultimately resulting in the loss of walking ability in roughly half of adults with the disorder.

CC researchers tested their prototype powered knee exoskeleton in a cohort study that followed 7 individuals between the ages of 5 and 19 who were diagnosed with crouch gait from cerebral palsy. The work was reported in *Science Translational Medicine*.

Walking with the exoskeleton was well-tolerated, with all participants able to walk independently without mobility aids or therapist assistance; six were able to do so in the first practice session. Improvements in knee extension were observed in six participants, with gains similar to or greater than average improvements reported from invasive surgical interventions. Importantly, the gains in knee extension occurred without a reduction in knee extensor muscle activity, indicating that these participants worked with the exoskeleton rather than offloading the task of straightening the leg during walking to the robot.

"Most wearable exoskeletons have been designed for adults with paralysis, with the exoskeleton replacing the user's lost function," said Dr. Thomas Bulea, principal investigator of the study. "We sought to create a device that could safely and effectively improve the posture of children with crouch gait while they walked. The improvements in their walking, along with their preserved muscle activity, make us optimistic that our approach could train a new walking pattern in these children if deployed over an extended time. This study paves the way for the exoskeleton's use outside the clinic setting, greatly increasing the amount and intensity of gait training, which we believe is key to successful long-term outcomes in this population."

Cerebral palsy is the most prevalent childhood movement disorder in the U.S., with approximately 10,000 new cases diagnosed each year. It is caused by a brain injury or abnormality in infancy or early childhood that disrupts the control of movement, posture and balance.

Zika Virus Selectively Infects, Kills Glioblastoma Cells in Mice

The Zika virus (ZIKV) may infect and kill a specific type of brain cancer cells while leaving normal adult brain tissue minimally affected, according to a new study supported by NIAID. In the paper, published online Sept. 5 in the *Journal of Experimental Medicine*, researchers describe the impact of ZIKV on glioblastoma cells in both human tissue samples and mice.

Even with current treatments, patients with glioblastomas—a highly malignant type of brain tumor—tend to have poor survival rates. Glioblastomas grow aggressively from a mass of unspecialized cells; ZIKV is known to infect similar cells in the nervous systems of developing fetuses. A fetus that acquires the virus from its ZIKV-infected mother during pregnancy can develop microcephaly and other serious abnormalities.

In this study, researchers at the University of California San Diego School of Medicine, Cleveland Clinic, Washington University School of Medicine in St. Louis and the University of Texas Medical Branch in Galveston introduced ZIKV to glioblastoma tissue samples removed from cancer patients as part of their treatment, as well as to healthy human neural tissue cultures. After 7 days, the researchers found that ZIKV had replicated in certain glioblastoma cells and prevented them from multiplying, while the ordinary neural tissue cultures remained largely uninfected.

The researchers also tested mice with glioblastomas, treating an experimental group with a mouse-adapted strain of ZIKV. Mice who received ZIKV survived longer than mice in the control group and their tumors were significantly smaller than those in the control mice after 1 week.

The researchers caution that ZIKV may behave differently when introduced to an active glioblastoma in a living person. Even if further studies continue to yield promising results, any potential treatment derived from ZIKV would need many years of rigorous testing for safety and efficacy.

Additional support for this study was provided in part by NCI and NINDS.

Sequencing All 24 Human Chromosomes Uncovers Rare Disorders

Extending noninvasive prenatal screening to all 24 human chromosomes can detect genetic disorders that may explain miscarriage and abnormalities during pregnancy, according to a study by

researchers at NIH and other institutions. Because of the way data have been analyzed, typical genomic tests performed during pregnancy have targeted extra copies of chromosomes 21, 18 and 13, but rarely evaluated all 24 chromosomes. The study findings, which appeared in the Aug. 30 issue of *Science Translational Medicine*, may ultimately improve the accuracy of these tests, including by explaining why some give false-positive results.

Women often request noninvasive screening tests to detect genetic conditions. These tests, however, typically focus only on Down syndrome and other common trisomies. A trisomy is a condition in which there are three instances of a certain chromosome instead of the standard two.

"Extending our analysis to all chromosomes allowed us to identify risk for serious complications and potentially reduce false-positive results for Down syndrome and other genetic conditions," said Dr. Diana Bianchi, senior author of the study and chief of NHGRI's prenatal genomics and therapy section. She is also NICHD director.

Drug Combination Reduces Risk of HIV Infection Among Teen Males

An NIH network study has confirmed that a combination of two drugs taken daily to reduce the chances of HIV infection among high-risk adults also works well and appears safe in males ages 15 to 17 years.

Truvada, a single pill containing the drugs tenofovir and emtricitabine, is currently approved for daily use in adults. The drug is the cornerstone of pre-exposure prophylaxis (PrEP), a strategy in which healthy people at risk for HIV infection take one or more anti-HIV drugs to reduce this risk.



The study, published in *JAMA Pediatrics*, was funded by NICHD, NIDA and NIMH.

"Several studies have shown that daily oral PrEP is effective in preventing HIV among people at high risk of becoming infected, but none of them included adolescents under age 18," said study author Dr. Bill Kapogiannis of NICHD's Maternal and Pediatric Infectious Diseases Branch. "Our study suggests that this therapy can safely reduce HIV risk for those under 18."

NIH also is funding studies of PrEP therapy for girls and young women. In an upcoming NIH-funded study in several African countries, adolescent females ages 16–21 will use a vaginal ring for 6 months, oral PrEP for 6 months, then choose which method they want to use for the final 6 months of the study.

Humphreys Retires Following Long NLM Career

Betsy Humphreys retired as deputy director of NLM recently after more than 44 years of service.

In a career that the NLM board of regents termed “one long highlight reel” in a commemorative resolution, Humphreys will be remembered for many contributions, including serving as acting director of NLM (Apr. 1, 2015-Aug. 14, 2016), leading the Unified Medical Language System project, pioneering NLM’s activities related to health data standards and for contributing to the development of NIH and HHS policies on health information technology, public access to research results and clinical trial registration and results reporting.



Betsy Humphreys (l) at her retirement ceremony; above, guests at the send-off in Kirschstein Auditorium express their sentiments.

PHOTOS: DANIEL SOÑE

• • •
***You have led, inspired,
mentored and modeled
behavior for so many and
held high such virtues as
diversity, inclusion and
cooperation.***

—DR. PATRICIA FLATLEY BRENNAN

• • •

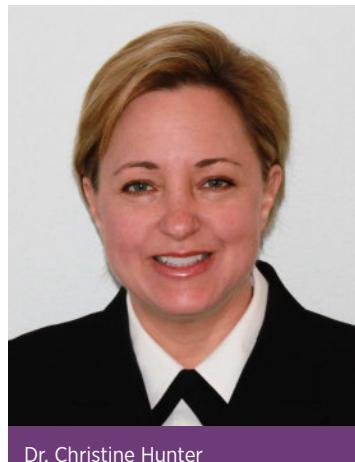
Hunter Named OBSSR Deputy Director

Dr. Christine Hunter has been named deputy director of NIH's Office of Behavioral and Social Sciences Research.

“Dr. Hunter has been a major contributor to trans-NIH, trans-agency and professional association efforts and her work has expanded the relevance and impact of the behavioral and social sciences,” said OBSSR director Dr. William T. Riley. “She has built a strong and vibrant behavioral science research community studying diabetes and obesity.”

Prior to joining OBSSR, Hunter served as director of behavioral research at the National Institute of Diabetes and Digestive and Kidney Diseases. Among her accomplishments at NIDDK, she led revision of the NIH Obesity Research Strategic Plan, developed and led the NIDDK Centers for Diabetes Translation Research and led numerous behavioral and social sciences research funding opportunity announcements.

Hunter serves on the National Collaborative on



Dr. Christine Hunter

NLM director Dr. Patricia Flatley Brennan, a friend and colleague of more than two decades, praised Humphreys’ many achievements, noting in a tribute that “one of your best has been your relationship with NLM staff members, in all divisions and at all levels. You have led, inspired, mentored and modeled behavior for so many and held high such virtues as diversity, inclusion and cooperation.”

Asked why she stayed at NLM, Humphreys said the answer was simple.

“A combination of the mission and the great people I get to work with.” Plus, she added, “I’ve never been bored,” pointing out that the library’s work

Childhood Obesity Research, the Opportunity Network for Basic Behavioral and Social Sciences Research, the science of behavior change and the behavior and environment subcommittee of the NIH obesity research task force. Her contributions to OBSSR have included serving on the NIH

behavioral and social sciences coordinating committee and the OBSSR strategic plan working group.

Over her career, Hunter has received many public health service honors and awards including the American Psychological Association’s Meritorious Research Service Commendation, the Outstanding Service Medal and the Presidential Unit Citation. In addition, she has received several NIH Director’s Awards and NIDDK Director’s Awards.

Hunter received her Ph.D. in clinical psychology from the University of Memphis and completed a postdoctoral fellowship at Wilford Hall Medical Center. Prior to joining NIH in 2006, she served in the United States Air Force stationed at Keesler Medical Center, Wilford Hall Medical Center and the Air Force Medical Support Agency with the Office of the Surgeon General.

encompasses everything from an 11th century manuscript to the next generation of data science. “It’s been fun!” she proclaimed.

The final section of the board resolution read, “Resolved, that the Board of Regents of the National Library of Medicine salutes and thanks Ms. Betsy Humphreys for her outstanding public service, unique vision, wisdom, and collaborative spirit for programs, services, systems, and tools, at NLM and beyond, that improved and enhanced research, patient care, and public health.”

The full text also appeared in *The Congressional Record*.

VOLUNTEERS

Flu Vaccine Study Recruits Healthy Volunteers

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 vaccine@nih.gov Online: <https://go.usa.gov/xNH7U>. Refer to study VRC316.

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>.



Above, food trucks provide the “tailgate” aspect of the event celebrating the kick-off of the college football season. Proceeds benefited Special Love Inc., a nonprofit organization that provides support and programs for families with children being treated for cancer.

NIH'ers Celebrate College Football Season

Are you ready for some football? These NIH'ers sure are. On Aug. 22, they wore their favorite college colors and chatted about their teams' prospects at the College Football Season Kick-Off Tailgate, held at the NIH Community Market behind Bldg. 10.

OD's Rosalina Bray said the tailgate began 4 years ago as a prelude to the college football season. At first, it celebrated only Southeastern Conference teams. Since then, the event has expanded to encompass all college football teams.

Participants ordered lunch from food trucks, Linda's Luncheonette and Captain Cookie & the Milk Man. Proceeds from the event benefited Special Love Inc., a nonprofit organization that provides support and programs for families with children being treated for cancer.



ABOVE: OD's Rosalina Bray wears her LSU Tigers shirt and NIGMS's Ken Bergman shows off his Crimson Tide lanyard at the College Football Tailgate.

LEFT: The Community Market was also an attraction.

BETWEEN: Bread lady displays loaves for sale.

PHOTOS: MARLEEN VAN DEN NESTE

