

TECH FOR TOTS

Lab Develops Coding Toys for Young Kids

BY DANA TALESNIK

These days, many kids know the alphabet and are starting to read by the time they get to kindergarten. Becoming literate in today's world, however, may also require learning another kind of language—that of computer programming.

Coding is all around us. It's found in things we touch and use every day, from smartphones to embedded sensors in ordinary objects. But can little kids learn coding?

“We want kids to understand that the world around them is full of smart objects and these objects have been programmed



Dr. Marina Umaschi Bers of Tufts University

and it's as simple as that,” said Dr. Marina Umaschi Bers, professor at Tufts University and co-founder and chief scientist of KinderLab Robotics. She spoke at a recent NIMH Director's Innovation Speaker Series

lecture at the Neuroscience Center.

Bers has spent decades researching ways to embed computer science into early childhood education. Some 20 years ago, as an MIT Media Lab graduate student, she was mentored by Seymour Papert, a pioneer in developing the first programming languages and robotic kits for children.

“We believe that coding is the literacy of the 21st century,” said Bers. “Literacy allows us to communicate, to generate and interpret meaning but, most importantly, it changes the way we think.”

Coding is a symbol system that uses a programming language. Though it relies heavily on math and science, coding also promotes problem-solving, trial and error, logic, ingenuity and abstract and strategic thinking, skills important for everyone. And although coding involves some complicated concepts, from algorithms to control

SEE **CODING**, PAGE 4



Young patient is Driven to Cure; see p. 12.

ALSO THIS ISSUE

Briefs	2
Alzheimer's Fundraising Stamp Issued	3
NEI Begins to Celebrate Its 50th Year	5
AAAS Honors Five from NIH	7
Digest	9
Milestones	10
Volunteers	11
Seen	12

CAN WE SYNTHESIZE ROLE MODELS? Chemist Sorensen Urges More American Indians to Pursue Science

BY CARLA GARNETT

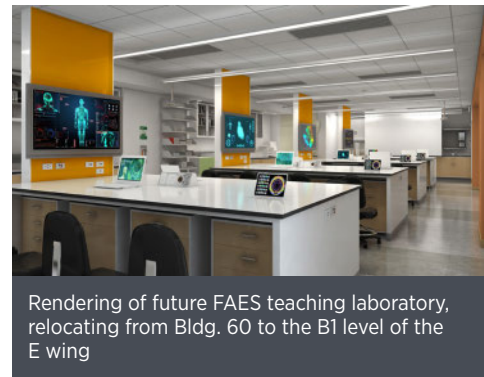
As a young pre-med undergrad at Syracuse University, long distance runner Erik Sorensen was more interested in getting on the school's Division I cross-country squad than he was in learning. It wasn't until junior year that he found a calling he couldn't ignore.

“When I took organic chemistry, my whole world changed,” he said. “I just fell in love—absolute love—with the subject of organic chemistry.”



Dr. Erik Sorensen

SEE **SORENSEN**, PAGE 8



Rendering of future FAES teaching laboratory, relocating from Bldg. 60 to the B1 level of the E wing

BLDG. 10

E Wing Renovation To Benefit Multiple Institutes

BY BRAD MOSS

The original Clinical Center—a massive 14-story, 2.5 million square foot, 7 million brick structure—has been home to countless medical discoveries at NIH since it opened in 1953.

Over several years, the F wing, the

SEE **RENOVATION**, PAGE 6

HR Sets Up New 'Internal Opportunities Board' Online

The Office of Human Resources announces the new NIH Internal Opportunities Board. The purpose of the board is to promote learning and development opportunities for employees to grow within the NIH community. The board is located at <https://ohr.od.nih.gov/iob/>. NIH will continue to honor all current collective bargaining agreements and will implement this system consistent with the agreements and its obligations under law, rule or regulation.



'PuppyCam' Relieves Stress at NIH

NIH hosted a PuppyCam at the Clinical Center in partnership with Hero Dogs Inc. and the Children's Inn at NIH on Nov. 30. The Twitter livestream featured service dogs, therapy dogs and puppies-in-training and offered stress reduction tips. Above, the inn's certified therapy dog, Zilly, made an appearance to let viewers know how she brings comfort, healing and stress relief to children, young adults and their families. She was joined by her certified handler Melissa Dell'Omo (r), special assistant to the inn's CEO and also Zilly's designated caretaker, along with inn residents Jordan Larocco (l), 7, of Arizona, and Jayla Lee, 14, of Tennessee.

PHOTO: SONJA LUECKE

Waletzky Honored with Lifetime Achievement Award

NIDA's Intramural Research Program hosted an event to honor Dr. Jeremy Waletzky for his work and support of addiction research by presenting him with the Lifetime Achievement Award. Waletzky is the father of Jacob, after whom the Society of Neuroscience Jacob P. Waletzky Memorial Award was named. Jeremy created the award to honor his son, who lost his battle with addiction. Recipients of the award are young scientists whose independent research has led to significant conceptual and empirical contributions to the understanding of drug addiction. To learn about Jacob's story, read <https://www.drugabuse.gov/about-nida/noras-blog/2015/12/personal-story-despair-hope-origin-jacob-p-waletzky-award>. For details on the event, go to https://irp.drugabuse.gov/news/jeremy_wal_event.php.



Acting HHS Secretary Visits NIH

Eric Hargan (second from l), acting secretary of HHS, visited NIH on Nov. 28, meeting with institute directors and OD staff in Bldg. 10 and getting clinical updates. Above, he gets oriented to the Clinical Research Center with (from l) hospital CEO Dr. James Gilman (l), NIH director Dr. Francis Collins and NCI director Dr. Norman Sharpless. Below, Hargan listens as Collins leads a discussion in the medical board room. During the morning visit, Hargan also met with Dr. Steven Rosenberg, chief of NCI's Surgery Branch, and one of his patients, and with Dr. Carlos Zarate, chief of NIMH's Experimental Therapeutics & Pathophysiology Branch.

PHOTOS: CHIA-CHI CHARLIE CHANG



Dr. Jeremy Waletzky (white shirt in front row) is joined by family members, previous winners of the Jacob P. Waletzky Award from 2004 to the present and NIDA scientific director Dr. Antonello Bonci (back, fourth from l).

Alzheimer's Fundraising Stamp Released

At a first-day-of-issue ceremony on Nov. 30, the U.S. Postal Service dedicated a stamp to help fund research on Alzheimer's disease. The Alzheimer's semipostal fundraising stamp costs 60 cents and includes the first-class mail single-piece postage plus an amount to fund Alzheimer's research. Revenue from sales of the Alzheimer's stamp will be distributed to the National Institute on Aging.

NIA deputy director Dr. Marie Bernard joined Postmaster General Megan Brennan, Rep. Elijah Cummings (D-MD), Johns Hopkins Bayview Medical Center president Dr. Richard Bennett and Johns Hopkins Bayview Medical Center Memory and Alzheimer's Treatment Center director Dr. Constantine Lyketos at the ceremony.

"We're in a new age of Alzheimer's research with a number of efforts under way," said Bernard. "The new semipostal stamp will both raise awareness of Alzheimer's research and care as well as contribute to the search for effective ways to prevent and treat this heart-breaking disease."

Currently, there are more than 6 million Americans living with Alzheimer's disease.



NIA deputy director Dr. Marie Bernard

With age the best-known risk factor for AD, that number is expected to grow exponentially as our population ages.

NIA is working to identify new genes that affect Alzheimer's disease and their role as risk factors or protective factors, to explore imaging techniques and ways to detect development of the disease well before symptoms appear, to develop and test new therapies and to test and implement new approaches to providing care and supporting caregivers.

Kathy Siggins of Mount Airy, Md., cared for her husband during his 13-year struggle with Alzheimer's. When he passed away in 1999, she started a 17-year campaign to get a fundraising stamp issued. She was honored for her efforts at the dedication ceremony.



On hand at the ceremony were (from l) Kathy Siggins, Postmaster General Megan Brennan, Rep. Elijah Cummings, Bernard, Dr. Constantine Lyketos and Dr. Richard Bennett.

PHOTOS: USPS

"We are here because so many people took their pain and turned it into a passion to do their purpose," said Cummings. Inspiring the audience to a standing ovation for Siggins, he said she is the perfect example of that. "You took the pain you were feeling and went out and did things that will affect generations yet unborn," he told her. The fundraising stamp, noted Cummings, is a way that anyone can contribute to Alzheimer's research.

Siggins got the idea from the Breast Cancer Research stamp, which was the first semipostal stamp ever issued by the United States. The Breast Cancer stamp has raised more than \$86.7 million for breast cancer research, with more than \$59 million going to the National Cancer Institute. Siggins and others at the event are optimistic the Alzheimer's stamp will have a similar impact. **R**



ON THE COVER: Conceptual image of a cell karyotype exhibiting trisomy—three copies of one chromosome.

IMAGE: DARRYL LEJA, NHGRI

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Coding

CONTINUED FROM PAGE 1

structures, even children can learn coding through developmentally appropriate environments and toys.

Bers and her DevTech research group at Tufts created two such coding experiences for youngsters. The first, Scratch Jr., is an interactive app, free to download, designed for kids ages 5 to 7. They choose or create characters and scenes, then drag and drop blocks to program the character to complete a series of actions. A kid might make a frog, for example, which jumps, then shrinks, then jumps again and rabbits. Suddenly, the child is playing a fun game that he or she programmed.

Scratch Jr. is based on Scratch, developed by MIT Media Lab for older kids. Unable to use Scratch with her own children because they were too little, Bers became inspired to collaborate with MIT on an age-appropriate junior version. Since launching in 2014, Scratch Jr. has had millions of downloads and has more than 200,000 weekly users.

But something was missing, recounted Bers. While Scratch Jr. fosters creative, open-ended play, it lacked a body. Bers wanted to develop a coding experience that simulates the playground experience, one that's active, social and didn't require eyes on a screen.

"Technologies are leaving laptops; they're becoming more part of the objects around us," said Bers, "so we need to understand the different impacts of the different interfaces and designs."

With that in mind, her DevTech lab invented KIBO, a small robot programmed with wooden blocks. KIBO has sensors to detect light, sound and distance and a light bulb that reflects output. The robot's scanner then reads the bar codes in the blocks.

"We start teaching kids from 4 years old the difference between an input and an output, while teaching them complex ideas from computer science," she said.

The child connects the programming blocks, then glides the robot over the blocks to scan their icons and tags. This brings the robot to life as it sings, dances, spins, beeps and lights up based on the sequence the child created.

"But the robot isn't finished because



Who says you can't have fun while learning? A young boy scans a KIBO robot over wooden programming blocks to bring the activity sequence he created to life.

PHOTO: DEVTECH/TUFTS

what's missing is the kid's individuality," said Bers. Kids are encouraged to decorate their robots. "We built art platforms for kids to bring their creativity and integrate their recyclables or other kinds of materials into the robot."

KIBO has more than 20 curriculum units to guide teachers who use it in classrooms. One unit is Dances Around the World, where kids can celebrate and learn about different cultures. Users can program their KIBO to dance to whatever they choose to choreograph, from the hula to the tango to Hava Nagila.

"That's what we're really looking for when we're teaching robotics and coding," said Bers. "We want to see the child or the adult behind it...who can use it to express themselves and really show who they are."

Although target groups for developing KIBO were kids with no known disability, Bers said they piloted KIBO with autistic children. At a school in Panama, the autistic youngsters understood how to program KIBO; interestingly, though, they all reversed the sequence by starting with an End block. The teacher had to flip the blocks around to make them scannable.

Recently, Bers has begun collaborating on research to learn what parts of the brain become activated when

kids program. The problem-solving areas of the brain are likely to light up on fMRI but what about other areas? If coding is a literacy, would language areas also become activated when kids program?

"If you start in early childhood, at a time when everyone is curious and open, and you take the mindset of a literacy approach, then we're really talking about something [much bigger]," said Bers. "Literacy is a power and gives us a voice. We know that those who can use [coding] language are those who are going to be in control of the future." **R**



"We know that those who can use [coding] language are those who are going to be in control of the future," said Bers.

LECTURE PHOTOS: LISA HELFERT

NEI Starts 50th Anniversary with Symposium

The National Eye Institute, established by President Lyndon B. Johnson in 1968, is celebrating its 50th anniversary in 2018. The year-long observance began at the Society for Neuroscience 2017 meeting with a satellite symposium, Vision and the Brain, held Nov. 10 at the Marriott Marquis in Washington D.C. The symposium celebrated the career of Dr. Robert Wurtz, former chief of NEI's section on visual motor integration. Wurtz joined NIH in 1965 as a physiologist at the National Institute of Neurological Diseases and Blindness. He retired from NEI this year after more than 50 years of service.



Nobel laureate Dr. Eric Kandel delivers the final presentation at the Vision and the Brain symposium.

Several of Wurtz's former students and postdocs attended. Two Nobel laureates—neuroscientist Dr. Torsten Weisel, president emeritus at the Rockefeller University in New York, and Dr. Eric Kandel, director of the Kavli Institute for Brain Science at Columbia University—were symposium speakers and regaled the audience with stories about Wurtz.

Wurtz's key innovation was to develop methods to study the visual system in animals while they were awake, rather than anesthetized. He trained monkeys to keep their eyes still for a few seconds, allowing him and his team to record visual neurons in action. This model is still used by scientists worldwide to study neurons involved in visual processing.

The symposium was the first of several NEI anniversary events planned for 2018:

- Exhibits at Brain Awareness Week (Mar. 14)
- NEI on Capitol Hill (Mar. 21)
- Symposium: Vision and Immunology (Mar. 22)
- Hands-on activities at USA Science & Engineering Festival (Apr. 6-8)
- NEI at Association for Research in Vision and Ophthalmology (Apr. 29-May 3)
- Symposium: Low Vision and Vision Rehabilitation (June 29)
- Symposium: Future of Vision Research (Oct. 18)

NEI also is releasing a video series to commemorate its 50th anniversary. The first two videos—*NEI, Leading the Fight Against Blindness* and *The Windows to Your Health*—are available now. Another two videos will follow later.

NIEHS'ers Among First Responders for Hurricane Relief

PHS, FEMA

NIEHS response to the 2017 hurricanes included officers in the Public Health Service and volunteers who worked with the Federal Emergency Management Administration.

"When Hurricane Irma hit, I got rapid deployment orders Sept. 11," said Mark Miller, NIEHS chief of staff. "I was on a plane to Atlanta less than 8 hours later." From Atlanta, he traveled to South Florida, where he led operation of a medical shelter in a high school. "This level of response shows what the PHS can do as a team to support impacted communities," he said.

In addition to his role at NIEHS, Cdr. Miller serves as a planning officer on a PHS rapid deployment force. For him and his 130 teammates, that meant early activation and deployment within hours of Irma's landfall.



Cdr. Mark Miller (r) led a team of medical responders at East Lee County High School near Fort Myers, Fla.

At a shelter in East Lee County High School, just east of Ft. Myers, Miller's team worked with the state department of health and local organizations to care for nearly 300 patients and family members.

Within 10 days, most were able to return home or make other arrangements, so Miller and approximately 65 clinicians moved to Florida International University (FIU) in Miami. There they managed a medical shelter for more than 75 individuals in need of dialysis and other medical attention.

"In the wake of Hurricane Irma, many U.S. Virgin Islands residents in need of dialysis were moved to Puerto Rico, because so many clinics were destroyed," Miller said. "But as Hurricane Maria approached, it was clear that Puerto Rico would not be safe either." So 97 dialysis patients were relocated from Puerto Rico to FIU via military aircraft.

Another PHS officer at NIEHS, Cdr. John McLamb, deployed to Puerto Rico on Oct. 25 to support response efforts in the wake of Hurricane Maria. He conducted environmental health and safety assessments in hospitals and evaluated drinking water systems on the island. He worked 14-plus days in and around areas where the infrastructure was heavily damaged. For example, he said it was common that 4 out of 5 utility poles were knocked down.

Many across HHS responded to the call for volunteers from the Federal Emergency Management Agency. Two from NIEHS were selected: Julie Nixon, emergency management program specialist, and James Williams, grants officer.

"To be here on the ground, ready to help these people survive this storm from the moment it hit, has been a life-changing experience," said Nixon.

Williams had previous experience with disaster relief through a similar deployment after Hurricane Katrina. "I was assigned to a team of six along Florida's Gulf coast," Williams said. "These areas were drastically impacted by the hurricane, many more by flooding than wind."

"I'm so proud to work for an institute that supports disaster relief the way NIEHS does," Miller said.—**Ian Thomas**



Renderings of a typical open laboratory (l) to be installed on floors 3 through 10 and the new NIH Blood Bank (r), including stem cell and gene therapy collection, to be located on the 1st floor of the renovated E wing

Renovation

CONTINUED FROM PAGE 1

western half of the building, has been immersed in a massive interior restoration. Now that it is complete, the eastern half, the E wing, gets its turn.

During F wing renovation, employees continued to occupy and work alongside ongoing construction. Over time, it became apparent this unique cohabitation was arduous and inefficient. For the E wing, this laborious phased approach will be scrapped. Instead, the 250,000 square feet of mostly vacant space will undergo a simultaneous top-to-bottom overhaul beginning in mid-2018, once entirely unoccupied.

Staff will begin to see entire floors close this month, starting with floors 11, 12 and 14. Once the wing is entirely vacant, pedestrian detours will be available on the first floor for east-to-west access during the duration of the project. Signage in the Clinical Center and the Take Me There app will provide routes, albeit sometimes circuitous, enabling pedestrians to reach their destination.

Before demolition and new construction work begin, plans are being developed to minimize the disruptions and challenges of noise, vibration, vivarium disturbances and dust control. When finished in 2021, the E wing will become the new home for more than 1,500 research and administrative staff, including 11 institutes and other organizations, state-of-the-art

utilities and equipment for specialized research, a new Blood Bank for the Clinical Center and new teaching laboratories for the Foundation for Advanced Education in the Sciences. The 12th floor is devoted to a brand new Center for Cellular Engineering creating cell therapies to reverse many debilitating diseases.

The Clinical Center's department of transfusion medicine, NIAID's Laboratory of Clinical Infectious Diseases, NIDDK's Genetics of Development and Diseases, Kidney Diseases and Molecular Medicine branches and NIMH's Human Brain Collection Core and the section of neuroadaptation and protein metabolism will also be housed in the refurbished space, along with staff from NHLBI, NHGRI and NINDS.

F Wing Renovation Achieves LEED Gold Certification

The renovation of the Bldg. 10 F wing, culminating in the transformation of 16 floors and 250,000 square feet of space inside the Clinical Center, was capped off with achievement of a LEED Gold Certification. The project converted former patient care and support units into flexible research laboratory and support space serving at least 12 different institutes and centers, including a series of clinical anatomical pathology laboratories for NCI's Laboratory of Pathology, with an autopsy suite and morgue, and various pathological, cytological and molecular labs.

LEED, or Leadership in Energy and Environmental Design, is a rating system developed by the United States Green Building Council to implement sustainable, environmentally friendly building elements in design and construction projects. The Gold certification is the second highest level on a scale of 4.

"It's a remarkable achievement for the project to achieve such a high rating,

which is difficult to accomplish in renovations, especially in a facility of the age, size and complexity of the Clinical Center," said Kenny Floyd, director of the Division of Environmental Protection, ORF.

Gold certification was achieved through various sustainable strategies targeting air quality, light, temperature, water and other energy efficiencies including novel chilled beam technology, hazardous material abatement and use of renewable, recycled, low-emitting and locally produced materials.

A modern approach to augment a building's air conditioning system, chilled beam technology provides energy savings by delivering primary air from a central system to structural beams through high-velocity nozzles and cools room air by passing it over water coils inside the chilled beams. These and other mechanical system design changes achieved a 15 percent reduction in energy use over a baseline building—a difficult achievement given the stringent requirements necessary for the F wing.

★ ★ ★

The 250,000 square feet of mostly vacant space will undergo a simultaneous top-to-bottom overhaul beginning in mid-2018.

★ ★ ★

The Office of Research Services' Division of Veterinary Resources will launch a more efficient and cost effective cage-wash system to support the ACRF vertical vivarium. And the NIH Director's Wednesday Afternoon Lecture Series, the highest-profile lecture program at NIH, will find a new home.

As with any major renovation project at

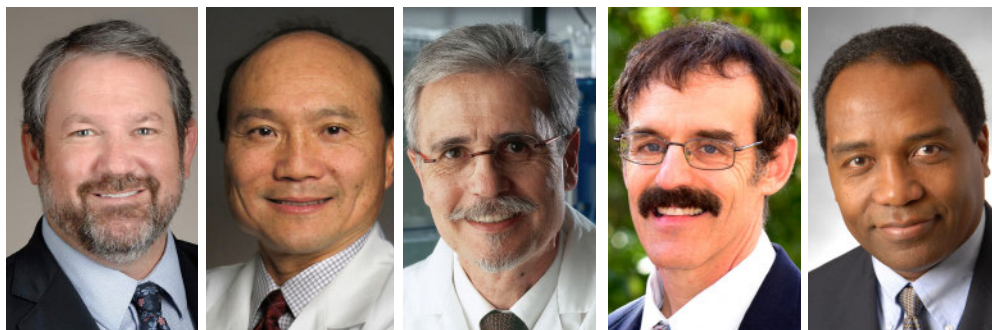
The exhaust air systems have sensors to automatically reduce energy use during down periods and recover and reuse heat that would otherwise escape into the atmosphere.

Carbon dioxide sensors react to densely occupied areas such as conference rooms, increasing fresh air flow. Occupancy sensors using infrared and ultrasonic devices "sense" when an area is vacant, powering down lighting systems in zones, with lighting in adjacent vacant areas reduced by 50 percent to eliminate harsh, light-to-dark situations for remaining employees.

Domestic water use was minimized with the installation of low-flow toilets and shower room fixtures and outdoor landscaping used plantings native or adapted to the region, requiring no additional watering after the initial plant-in period. Heat-reflecting roofing helped reduce the urban heat island effect. Finally, alternative flooring and wood products using renewable linseed oil and wheat board were selected when possible.—Brad Moss

NIH, the aim is to integrate many environmentally sensitive and high-performance design strategies. For the E wing, the goal is to achieve a Silver certification following the LEED (Leadership in Energy and Environmental Design) green building rating system. Energy-efficient light fixtures and controls will be installed. A chilled beam system and upgraded mechanical systems will provide additional energy efficiency (see sidebar). All existing exterior windows will be replaced with high-performance windows containing insulated low-E glass matching those in the recently renovated F wing. Highly recycled content and local materials will be utilized whenever possible to reduce the carbon footprint and indoor air quality will meet zero-VOC (volatile organic compounds) and low toxin requirements.

Dr. Richard Wyatt, deputy director, Office of Intramural Research and co-chair of the E Wing steering committee, noted, "Our research community should be very enthusiastic about the upcoming E wing renovations based on the successful transformation of the F wing into much needed modern lab space. Any *in situ* renovations, however, require quite a lot of tolerance by neighboring occupants due to noise, dust and disruptions. Thanks to all for tolerating these." **B**



Newly elected AAAS fellows include (from l) Dr. Joshua A. Gordon, Dr. T. Jake Liang, Dr. Yves Georges Pommier, Dr. David Benjamin Resnik and Dr. Griffin P. Rodgers.

AAAS Honors Five from NIH

Five NIH scientists, including two institute directors, were recently elected fellows of the American Association for the Advancement of Science. The AAAS honored 396 of its members for 2017 in recognition of their contributions to science and technology, scientific leadership and extraordinary achievements across disciplines.

From the section on history and philosophy of science: Dr. David Benjamin Resnik, bioethicist, NIEHS.

From the section on medical sciences: Dr. T. Jake Liang, chief, Liver Diseases Branch and chief of both the liver diseases virology section and the clinical research section, NIDDK; and Dr. Griffin P. Rodgers, director, NIDDK.

From the section on neuroscience: Dr. Joshua A. Gordon, NIMH director.

From the section on pharmaceutical sciences: Dr. Yves Georges Pommier, chief, Developmental Therapeutics Branch and Laboratory of Molecular Pharmacology, Center for Cancer Research, NCI.

The new AAAS fellows will be recognized on Feb. 17, 2018, at the AAAS annual meeting in Austin, Tex. They will be presented with an official certificate and a rosette pin, the emblem of fellowship.

The tradition of AAAS fellows dates to 1874. AAAS is the world's largest general scientific society and publisher of the journal *Science* as well as *Science Translational Medicine*; *Science Signaling*, a digital, open-access journal; *Science Advances*; *Science Immunology*; and *Science Robotics*.

AAAS was founded in 1848 and includes nearly 250 affiliated societies and academies of science.

NHLBI Hosts Training Workshop for Health Equity Researchers

NHLBI's Center for Translation Research and Implementation Science recently partnered with several other NIH components and the HHS Office of Minority Health to conduct a workshop, "Training the Next Generation of Implementation Researchers for Health Equity."

Health inequities research is crucial for making progress in eliminating preventable differences in outcomes for cardiovascular disease, blood disorders, mental health and diabetes.

At the workshop, more than 30 experts addressed best practices for designing training programs, enhancing participation and identifying mentors.

The workshop also featured the inaugural Dr. Elijah Saunders and Dr. Levi Watkins Memorial Lecture delivered by Dr. Lisa A. Cooper, James F. Fries professor of medicine and director, Johns Hopkins Center for Health Equity.

In addition to being remarkable cardiovascular specialists and visionaries for health equity, Saunders and Watkins were compassionate

leaders committed to mentoring the next generation of medical doctors and researchers. The lecture and workshop honored their legacies.

"Many training programs emphasize knowledge-building, but need to incorporate skills-building to be more open-minded and better able to interact" in the context of community and stakeholder engagement, said Cooper. She also noted that the next generation of researchers should seek out multiple mentors and shared examples of support she received from numerous mentors during her career.

For more information about the workshop, contact Dr. Melissa Green Parker (melissa.



Dr. Lisa A. Cooper (front, c) joins other participants at NHLBI's "Training the Next Generation of Implementation Researchers for Health Equity" workshop.

PHOTO: REBECCA ROPER

greenparker@nih.gov) or Helen Hunter Cox (Helen.Cox@nih.gov).



Sorensen discusses the importance of role models in scientific workforce diversity. Below, he chats with lecture attendees including NIH director Dr. Francis Collins (l) and THRO director Dr. Dave Wilson (r).

PHOTOS: DANIEL SOÑE

Sorensen

CONTINUED FROM PAGE 1

Currently the Arthur Allan Patchett professor in organic chemistry at Princeton University, Sorensen gave a lecture Nov. 9 in honor of National Native American Heritage Month, sponsored by the Tribal Health Research Office (THRO) in NIH's Division of Program Coordination, Planning and Strategic Initiatives.

"It's hard for our people to relate to a subject like chemistry," said Sorensen, a member of the Onondaga Nation in the Iroquois Confederacy. He spent his early childhood through age 7 living on the Onondaga reservation near Syracuse, N.Y.

"It's a bit of a barrier," he explained, "if you're Native American and you grow up worshipping nature, you don't naturally gravitate to a field like chemistry. But I did. I became inspired by [chemical] transformations as a young student. I much admired the way that nature can make the polycyclic triterpenes from acyclic chains of alkenes—the marvelous complexity generating structural transformations that are spontaneous."

Role models and mentors also had a tremendous impact on young Sorensen. In his lecture, he traced his successful career path back to several strong familial influences, including his great grandmother, grandmother, sister and uncle—Leo Nolan III, an Indian Health Service retiree and member of the Mohawk Nation who was in the Wilson Hall audience to hear Sorensen's talk.

"We can all point to inspiring teachers in our past who put us on a track that may have impacted in a positive way our career choice," Sorensen said, naming Roger C. Hahn and James Kallmerten as professors who inspired him.

It was most likely noted organic chemist Dr. K.C. Nicolaou—renowned for his research on vancomycin and taxol—who

played the most monumental role in Sorensen's decision to pursue science. A paper by Nicolaou, on how complex compounds found in nature can be synthesized, so fascinated Sorensen that he felt compelled to drop medicine as a major and take up a different scientific field.

"I responded instantly to the aesthetics of organic chemistry, the aesthetics of structural transformations—both naturally occurring and also structural transformations that chemists have developed," Sorensen said. "I broke my mother's heart. 'What does a chemist do?' she asked. She actually cried."

Sorensen was determined, though, and his hard work was rewarded with a graduate post in the lab of Nicolaou, who eventually became Sorensen's doctoral thesis advisor at the Scripps Research Institute and at the University of California, San Diego.

Now leading his own independent research group in the Frick Chemistry Laboratory at Princeton—he's held grants from NCI, NIGMS and NIH's National Research Service Award—Sorensen intends to parlay his passion for chemistry into recruitment of young people, endeavoring to lure more Native Americans and other members of underrepresented minority populations into science.

That made him the perfect choice to keynote NIH's Native American Heritage Month observance, hosted by THRO director Dr. Dave Wilson, a member of the Navajo Nation. "Native Pride and Spirit," this year's theme, focuses on strongly linking the legacy of American Indians to the next generation of thought leaders, engineers and particularly, scientists.

Opening the event, NIH director Dr.



Francis Collins recalled valuable lessons he experienced while overseeing the Human Genome Project.

In trying to decipher how "our own DNA instruction book could provide benefits to people across many different parts of this country and outside the country," he noted, "I learned a lot by working with Native American communities, understanding the issues that are very important to them in terms of how this kind of information can be utilized for benefit or, at times, in ways that they were not happy about that we needed to learn from as well. So I'm delighted we have this chance now through [THRO] to create even more visible and ongoing focus on issues that are of interest to the American Indian and Alaska Native communities."

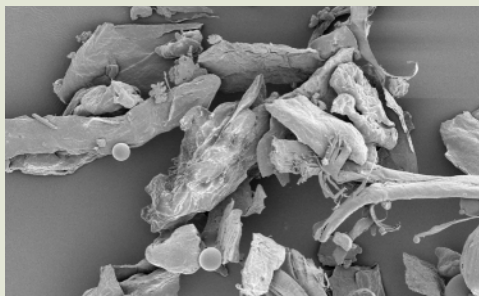
Sorensen identified several cultural challenges to attracting and retaining promising Native American talent to STEM fields.

"All of the Native students that I know are deeply connected to our families and to our cultures...and [do not immediately embrace] the idea of leaving our homes to go out into the world and pursue studies that are long and hard toward a degree in the sciences," he pointed out. "It's not obvious how that is going to improve our lives back at home. What good would a degree in chemistry do me back at home on the Nation?"

Sorensen said it's up to American Indians, like himself, already working in the sciences, to reach back and offer other underrepresented groups a view of what's at stake and the benefit of STEM careers.

"We need to improve our teaching, but we also need to diversify our professoriate," Sorensen concluded. "This is a big issue that resonates strongly with me. When young underrepresented minority students look at the faculties of chemistry departments nationwide, they don't see people who look like them. They see very few people with similar life experiences and cultural connections. We keep hiring new faculty who look an awful lot like the people we already have. There isn't much diversity in chemistry departments...I'm a little bit pessimistic on this issue, but I think we can certainly strive to make these departments do better at increasing diversity...Role models are important and we all know that to be true."

The full event is archived at <https://videocast.nih.gov/summary.asp?Live=26435&bhcp=1>. **R**



Household dust, magnified

IMAGE: NIAID

Allergens Widespread in Largest Study of U.S. Homes

Allergens are widespread, but highly variable in U.S. homes, according to the nation's largest indoor allergen study to date. Researchers from NIH report that more than 90 percent of homes had 3 or more detectable allergens and 73 percent of homes had at least 1 allergen at elevated levels. The findings were published Nov. 30 in the *Journal of Allergy and Clinical Immunology*.

"Elevated allergen levels can exacerbate symptoms in people who suffer from asthma and allergies, so it is crucial to understand the factors that contribute," said Dr. Darryl Zeldin, senior author and scientific director at NIEHS.

Using data from the 2005-2006 National Health and Nutrition Examination Survey, the researchers studied levels of 8 common allergens—cat, dog, cockroach, mouse, rat, mold and 2 types of dust mite allergens—in the bedrooms of nearly 7,000 U.S. homes.

They found that the presence of pets and pests had a major influence on high levels of indoor allergens. Housing characteristics also mattered—elevated exposure to multiple allergens was more likely in mobile homes, older homes, rental homes and homes in rural areas.

For individual allergens, exposure levels varied greatly with age, sex, race, ethnicity and socioeconomic status.

Differences were also found between geographic locations and climatic conditions. For example, elevated dust mite allergen levels were more common in the South and Northeast and in regions with a humid climate. Levels of cat and dust mite allergens were also found to be higher in rural areas than in urban settings.

Study of WWII Evacuees Suggests Mental Illness May Pass to Offspring

Mental illness associated with early childhood adversity may be passed from generation to generation, according to a study of adults whose parents evacuated Finland as children during World War II. The study was conducted by researchers at NIH, Uppsala University in Sweden and Helsinki University in Finland. It appears in *JAMA Psychiatry*.

The research team found that daughters of female evacuees had the same high risk for mental health disorders as their mothers, even though they did not experience the same adversity. The study could not determine why the higher risk for mental illness persisted across generations. Possible explanations include changes in the evacuees' parenting behavior stemming from their childhood experience or epigenetic changes—chemical alterations in gene expression, without any changes to underlying DNA.

"Many studies have shown that traumatic exposures during pregnancy can have negative effects on offspring," said study author Dr. Stephen Gilman of NICHD. "Here, we found evidence that a mother's childhood traumatic exposure—in this case separation from family members during



Child evacuees in Turku, Finland, 1939

IMAGE: WIKIMEDIA COMMONS

war—may have long-lasting health consequences for her daughters." From 1941 to 1945, roughly 49,000 Finnish children were evacuated from their homes to protect them from bombings, malnutrition and other hazards during the country's wars with the Soviet Union. The children, many of them only preschoolers, were placed with foster families in Sweden. In addition to separation from their families, the children faced the stresses of adapting to their foster families, and in many cases, learning a new language. Upon their return, many children experienced the additional stress of readjusting to Finnish society.

During the same time, thousands of Finnish families chose not to evacuate all their children and often kept some at home, but little information exists on the rationale for their decisions. The researchers compared the risk of being hospitalized for a psychiatric (mental health) disorder among offspring of the evacuees to the risks of psychiatric hospitalization among the offspring of the siblings who remained with their parents. Studying the two groups—cousins to each other—allowed the researchers to compensate for family-based factors that can contribute to mental health problems and to focus instead on the evacuees' wartime experience.

The researchers found that female evacuees and their daughters were at the greatest risk for being hospitalized for mood disorders, such as depression and bipolar disorder. In fact, the evacuees' daughters had more than 4 times the risk of hospitalization for a mood disorder, compared to the daughters of mothers who stayed home—regardless of whether their mothers were hospitalized for a mood disorder.

The authors concluded that future studies are needed to understand how the experience of war affects the mental health of parents and their offspring and to develop interventions to help families affected by armed conflict.

NIAID Scientists Link Unexplained Anaphylaxis to Red Meat Allergy

While rare, some people experience recurrent episodes of anaphylaxis—a life-threatening allergic reaction that causes symptoms such as the constriction of airways and a dangerous drop in blood pressure—for which the triggers are never identified. Recently, researchers at NIAID found that some patients' seemingly inexplicable anaphylaxis was actually caused by an uncommon allergy to a molecule found naturally in red meat. They note that the allergy, which is linked to a history of a specific type of tick bite, may be difficult for patients and health care teams to identify.

As the researchers describe in their article published in *Allergy*, 6 of the 70 study participants evaluated for unexplained frequent anaphylaxis tested positive for an allergy to galactose- α -1,3-galactose, or alpha-gal, a sugar molecule found in beef, pork, lamb and other red meats. The six adult male participants all had IgE antibodies—immune proteins associated with allergy—to alpha-gal in their blood. After implementing diets free of red meat, none of them experienced anaphylaxis in the 18 months to 3 years during which they were followed.

While the prevalence of allergy to alpha-gal, or "alpha-gal syndrome" is not known, researchers have observed that it occurs mostly in people living in the Southeast region of the United States and certain areas of New York, New Jersey and New England. This distribution may occur because most people with an allergy to alpha-gal, including all six participants evaluated at NIH, have a history of bites from juvenile *Amblyomma americanum*, or Lone Star ticks.

"Alpha-gal allergy appears to be yet another reason to protect oneself from tick bites," said NIAID director Dr. Anthony Fauci. "Food allergies can range from an inconvenience to a life-threatening condition and pose a serious and growing public health problem that urgently requires more research."



Lone star tick

IMAGE: NIAID



Dr. Anna María Nápoles

Nápoles Named NIMHD Scientific Director

Dr. Anna María Nápoles is the new scientific director at the National Institute on Minority Health and Health Disparities. She is the first Latina named to the position at NIH.

Nápoles comes from the University of California, San Francisco, where she served as a professor and behavioral epidemiologist in the division of general internal medicine, department of medicine since 2001. She has been at the forefront of developing methods for community-engaged, translational research to improve the health of disparity populations.

She brings more than 30 years of experience in research on patient-clinician communication, cancer control health disparities, psycho-oncology and community-based models of research in racially, ethnically and socioeconomically diverse populations. She has served as a scientific advisor to numerous NIH and non-NIH funded research projects, consulting on methods for studying complex socio-behavioral processes that affect the health of disparity populations.

In her new role, she will focus on population health with an emphasis on social, behavioral and clinical research. She will also offer scientific leadership of NIMHD's intramural research program.

"Dr. Nápoles will provide NIMHD with a unique insight as the first Latina scientific director," said NIMHD director Dr. Eliseo Pérez-Stable. "Her breadth of knowledge and notable scientific contributions are exactly what NIMHD needs to meet the challenges of the ever-evolving health disparities environment for all race/ethnic minorities. Her extensive research experience, collaborative nature and expertise within the science community will make her a great addition to the NIMHD team. Anna is the embodiment of one of the NIMHD intramural research program's major objectives, which

is to add to the diversity of individuals and research disciplines in the NIH intramural program."

Nápoles received her master's degree and doctorate from the University of California, Berkeley. She holds a bachelor's degree from Pomona College. She has published more than 75 journal articles.

In 2003 and 2005, Nápoles received the Rising Star in Cancer Research Award from the Redes En Acción Network and in 2016 was a Susan G. Komen Scholar.

NIGMS Program Director Chin Retires

Dr. Jean Chin, a program director in the NIGMS Division of Cell Biology and Biophysics (CBB), has retired after 23 years of service. Over that time, she handled research grants in multiple scientific areas, including nucleic acid-protein interactions and viral assembly before focusing on membrane proteins and lipids.

Chin was known as a champion for the research supported in her portfolio, a strong supporter of basic research and a mentor for junior colleagues at NIH.

She earned her Ph.D. in biochemistry at Dartmouth College and was a postdoctoral researcher at Harvard, working on regulation of the interactions of sterols—a naturally occurring subgroup of steroids. She joined NIH in 1991 as a senior staff fellow in NICHHD's Cell Biology and Metabolism Branch.

Chin began her career with NIGMS in 1994 as a program director in CBB. She was an early supporter of research on the structural biology of membrane proteins and a co-leader of the NIH Common Fund structural biology program.

Chin was also the NIGMS point of contact for the Academic Research Enhancement Award R15 program—a mechanism to enhance the research environment at schools that have not been major recipients of NIH support—and was influential in making the R15 a standard, renewable award. She also was frequently invited to speak at meetings of organizations such as the Council on Undergraduate Research and the American Association of State Colleges and Universities. She informed investigators from smaller institutions about how NIH and its peer review system works and how to improve their applications. These activities, along with her other grant responsibilities, enabled her to help thousands of investigators over her career.

"I really enjoyed going to my investigators' talks and their posters, especially their students'

posters," said Chin. "It was really fun because they'd be so proud to introduce their students and postdocs. Before I knew it, these trainees became faculty members themselves and I'd find myself working with the second and sometimes even the third generation of scientists."

In her free time, she and her husband Donald Schneider, another long-time NIH employee (retired, part-time contractor at the Center for Scientific Review), ride their tandem bicycle around the mid-Atlantic area on weekends and take cycling vacations across the country and abroad.

"I have long known Jean for her sunny optimism and leadership," said Dr. Peter Preusch, acting director of the Cell Biology and Biophysics Division. "We're wishing her the best and happiest two-seated retirement possible."—Chris Palmer

NIDCD Budget Officer Rotariu Bids Farewell After 32 Years

After 32 years at NIH, Mark Rotariu, budget officer at NIDCD, retired recently.

During his tenure at NIDCD, Rotariu served NIH in a variety of leadership roles, including the administrative restructuring advisory committee, the administrative training committee and the NIEHS management review team. He provided senior executive leadership to other parts of NIH in an acting capacity, including deputy executive officer at NEI, associate director for budget for NIH and executive officer at ORS and ORF. He also volunteered at the Children's Inn at NIH, serving on its finance committee.

In addition to his career roles, Rotariu was involved in other NIH activities. He led the men's softball league, managed a team and played for many years; served as secretary of the R&W Association; served as a member of the NIH Federal Credit Union credit committee; and was a member of the NIH Sailing Club. He received several awards, including a NIH Director's Award, NIH Merit Award, NIDCD Award of Excellence, NLM Director's Award and NHLBI Merit Award.

"It has been my honor to work side-by-side with Mark and to have the opportunity to learn from him and gain from his valuable experience," said Timothy Wheelles, NIDCD executive officer. "Mark's involvement and commitment to the NIH mission have been great assets to the NIH community and his strong expertise and leadership on all things budget have been an incredible resource to both myself and other leaders of the institute."



Dr. Jean Chin



Mark Rotariu

Rotariu began his career in the budget office of the National Heart and Lung Institute (predecessor to NHLBI), where he advanced from budget clerk to deputy budget officer while earning a degree in political science from American University. He graduated from AU in 1979.

In 1981, he joined the National Library of Medicine as budget officer. During his tenure there, Rotariu helped defend NLM's pricing policies for its biomedical information products and services from vigorous attack by a foreign publishing firm. In recognition, he received the first annual NLM Director's Award. While at NLM, he also earned a master's degree in public administration from AU.

In 1988, he was appointed executive officer at the National Center for Nursing Research, a new center

at the time, where he hired key administrative managers, secured resources and developed policies and procedures.

After 17 years at NIH, Rotariu left to work for a pharmaceutical company and a biotech firm and earned a master of business administration degree from Rutgers University. He returned to NIH in 2002 and finished his last 15 years as budget officer at NIDCD.

At his retirement celebration, Rotariu's two children, Elizabeth and Jack, surprised him with speeches. They both mentioned that he wanted to do many things while he was working and he'd always say, "When I retire..." His plans include continuing to follow Washington sports teams and traveling.



Dr. Soojay Banerjee

Researcher Banerjee Mourned

Dr. Soojay Banerjee, a long-time researcher at NIH, died Oct. 23 after a 2-year battle with cancer, 4 days past his 50th birthday.

Banerjee earned his bachelor's degree in chemistry from the University of Delhi in India in 1990, and his Ph.D. in chemistry from Pennsylvania State University in 1995. Following a decade of research in academia and industry, he came to NIH in 2005 to join the laboratory of Dr. Richard Youle in NINDS.

In 2012, he also joined the laboratory of Dr. Sriram Subramaniam at NCI part-time, splitting his biochemical research between the two groups. He was also a part-time faculty member at Montgomery College in Rockville from 2005 until 2017.

Banerjee was a skilled biochemist, specializing in the purification of proteins for structural

analysis. In Youle's group, he played a key role in the identification of the first ubiquitin kinase. In the Subramaniam lab, he led a project that resulted in the first high-resolution structure of the AAA+ ATPase p97 with cryo-electron microscopy and the discovery of a mechanism by which a small molecule inhibitor of the protein blocked function. He also played a key role in projects that advanced the field of cryo-electron microscopy, including his participation in the FEI-NIH Living Lab, a successful public-private partnership and in the determination of important structures that were referenced in the 2017 Nobel Prize in chemistry.

But perhaps Banerjee's greatest contribution to the NIH community was his spirit—he was kind, generous and unfailingly optimistic, mentoring countless trainees and other scientists over his 12 years at NIH. Likewise, his chemistry students at Montgomery College praised not only his skill at teaching, but also his willingness to answer any question at any time.

"I never heard Soojay utter a single unkind thing about anyone. I never knew him to turn anyone away that came to him for help," said Subramaniam.

"I have never worked with anyone so innately happy as Soojay," agreed Youle. "He was kind, fun, funny and extremely generous. He would move mountains to help others."

Banerjee is survived by his wife Nese Sari and sons Burak and Emre.—Lesley Earl

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"I have never worked with anyone so innately happy as Soojay. He was kind, fun, funny and extremely generous. He would move mountains to help others."

—DR. RICHARD YOULE

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Study Needs Healthy Children

NICHD seeks healthy children 7 to 11 years old to join in a research study. Researchers want to learn if breaking up sitting with short periods of activity improves children's metabolism and attention. Six outpatient visits on consecutive days of about 3 hours each (Monday-Friday, early evening and Saturday morning) are required. Compensation will be provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010). Read more at <https://go.usa.gov/xRPAg>. Refer to study 17-CH-0130.

Do You Have Asthma?

Do you have asthma? NHLBI is seeking volunteers with asthma for a study. Two outpatient visits and one inpatient stay at the Clinical Center are required. Compensation may be provided. For more information contact the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read more online at <http://go.usa.gov/xKFGS>. Refer to study 99-H-0076.

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>.

Women with HSIL Sought

NCI seeks women with vulvar high-grade squamous intraepithelial lesion (HSIL) for a new study. Researchers are testing whether using genetically modified immune cells can successfully treat women with HSIL. For more information, call Erin Ferraro at 1-833-815-0387. Read more at <https://go.usa.gov/xnbdQ>. Refer to study 17-C-0016.

Flu Vax Study Recruits Healthy Vols

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

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.

DRIVEN TO CURE

NIH Cancer Patient Receives Humanitarian Award

BY DANA TALESNIK

Getting diagnosed with a life-threatening disease might make some people retreat and perhaps consider pursuing a big item on their bucket list. When Andrew Lee, at the age of 19, learned he had an incurable rare cancer, he chose to fight it and has since participated in multiple NIH-led clinical trials. Yet he was determined to do even more. So, when his father bought him his dream car, he turned it into a fundraising vehicle.

Humbled by his father's gift—a 2015 Nissan GT-R—Lee started the nonprofit Driven to Cure (DTC). In 1½ years, the charity already has raised more than \$300,000 for rare kidney cancer research.

On Nov. 17, Lee's sports car, painted the bright orange that represents rare kidney cancer awareness and with a license plate that reads "F CANCR," was parked outside the Children's Inn at NIH, where children stay with their families while enrolled in clinical trials. Lee has visited the inn several times to show the car to excited young residents. That day, he was there to receive a special honor.

Surrounded by his parents, friends and several sponsors and government representatives, Lee received the William Donald Schaefer Helping People Award for Montgomery County, named after the former Maryland governor and Baltimore City mayor.

"You're an inspiration, Andrew, across the county, across the state," said Maryland Comptroller Peter Franchot, who presented the award. Much like the award's namesake, "Andrew embodies the same commitment of putting others ahead of himself...The hope you give others through your courage, your advocacy, your philanthropic work...Aces up; you're my hero."

Franchot also presented honorary medallions to Children's Inn CEO Jennie Lucca and Dr. Marston Linehan, NCI Urologic Oncology Branch chief, who has been one of the doctors, along with Dr. Ram Srinivasan, involved in Lee's case.

"By turning his illness into an awareness and fundraising tool to fight his cancer, Andrew serves as a real-life superhero,"



In front of Andrew Lee's DTC GT-R outside the Children's Inn are (from l) Montgomery County council member Nancy Floreen, Maryland House Majority Leader C. William Frick, Comptroller Peter Franchot, NIH Children's Inn CEO Jennie Lucca, Andrew Lee and NCI Urologic Oncology Branch chief Dr. Marston Linehan.

said Lucca. Nodding at the GT-R outside, Montgomery County council member Nancy Floreen called Lee "the king of cool."

"I think a lot of us, if we got the news you got, would be living lives of selfishness," said Maryland House Majority Leader C. William Frick. "But you're focusing on recovery and living a life of service and that's incredible."

It's been 2½ years since doctors told Lee he had 6-12 months to live. In spring 2015, after finishing his freshman year of college at the University of New Hampshire, he was diagnosed with stage 4 HLRCC (hereditary leiomyomatosis and renal cell cancer), a cancer so rare it's been reported in about 100 families worldwide.

"Every good day gets Andrew closer to new cures and the next generation of drugs," said Andrew's father, Bruce Lee.

The cancer drugs tested in Lee's three clinical trials were developed for other kinds of cancer, so this research has the potential to help discover treatments for a

variety of cancers. Linehan leads the team of NIH doctors who continue to collaborate with Yale Cancer Center and Georgetown University's Lombardi Cancer Center on Lee's care. Currently, Lee is not in a trial but in standard care at NIH.

In between treatments, Lee has driven to auto shows and other events raising money for DTC. He's had setbacks; high fevers, pain and other side effects prevented him from attending some events. But through each hurdle, he worked to get strong and get back on the road.

"You start a nonprofit because it's something you're truly passionate about," said Lee. "You never think you're going to win an award, but it's seriously motivating for the future. I'm very excited for 2018."

After the event, Lee took Franchot out in the GT-R for a quick spin, then took time to chat with all those who hovered around the car, including the father of an inn patient who had stopped to admire the shiny piece of engineering.

Thanks to the charitable work of mechanics, detailers and sponsors, the GT-R has been retrofitted inside and out. The bright orange paint, created by BASF's American branch, has been patented and dubbed "Glasurit DTC Orange." All proceeds from sales of this color are donated to DTC.

As Andrew prepared to spend quality time with family and friends this holiday season, the wheels were already turning with plans for the coming year. "We're going to evaluate and rework the plan," he said. "I want to expand Driven to Cure beyond rare kidney cancer, to raise awareness and funding for all rare cancers." **R**



Franchot presents Linehan with an honorary medallion in appreciation for "the medical miracles you're working on."

PHOTOS: CHIA-CHI CHARLIE CHANG