

'NIH'S GOT TALENT'

Cordial Competition Benefits Combined Federal Campaign

BY TIM EVANS

In support of this year's Combined Federal Campaign (CFC), an overflow audience packed Masur Auditorium on Nov. 14 to cheer on performers who took the stage for "NIH's Got Talent."

Modeled after the TV show *America's Got Talent*, the NIH version had it all. Twenty-six acts featured music, comedy and performance art, all judged by biomedical research celebrities Dr. Lawrence Tabak, NIH principal deputy director; Dr. Maria Freire, president and executive director of the Foundation for the NIH; and Dr. Alfred



The Building 1-ders open the NIH's Got Talent show.

Johnson, NIH deputy director for management. As the event's engaging host, John Burklow, NIH associate director for

communications and public liaison, ensured the show ran smoothly.

Inspired by the 2018 CFC theme "Show Some Love," NIH director Dr. Francis Collins and NIH associate director for science policy Dr. Carrie Wolinetz—the "Building 1-ders"—opened the extravaganza with a light-hearted rendition of *Put a Little Love in Your Heart*. The range of talent that followed was equally impressive.

The show was packed with variety, from NIDDK's piano performance of Chopin's Prelude in E Minor to NICHD director Dr. Diana Bianchi and colleagues Dana Bynum and June Tillman hula-hooping their way across the stage to Abba's *Dancing Queen*. NIMHD director Dr. Eliseo Pérez-Stable joined Kimberly Allen for a Spanish vocal performance of

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New 'field' looks at call of nature and psychological health. See story, p. 3.

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2018 CENSUS COMPLETE Bluebirds Make a Comeback

BY CARLA GARNETT



Baby bluebirds in box near Safra Lodge

PHOTO: JENNIFER WATSON

Numbers have been crunched and the tallies have been totaled. With all the data now in, the verdict is clear: NIH's homesteader bluebirds (and other mosquito-eaters) have rebounded, after a noticeable 5-year absence.

"I'm proud to reveal that we were able to fledge six bluebirds this year!" announced Brandon Hartz, NIH landscape

Clock Genes Keep Organisms On Schedule

BY ERIC BOCK

Biological mechanisms called circadian rhythms regulate biological functions throughout the day in animals, including sleep, eating schedules and metabolism, said Dr. Michael Young.

"We have clocks in our skin, liver, lungs, kidneys, skeletal muscles and, of course, our brains," said Young, Nobel laureate (2017) and Richard and Jeanne Fisher professor and head of the Laboratory of Genetics at the Rockefeller University. He gave the NIGMS



Dr. Michael Young

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SEE CLOCK GENES, PAGE 8

Bldg. 31C Conference Center to Get Facelift, Reopen in Early 2020

The Bldg. 31 Conference Center has served NIH well for 50 years but has not received any significant updates and is showing its age and inadequacies. The Office of Research Services' Events Management Branch, in partnership with the Office of Research Facilities, will begin a yearlong renovation to the 6th floor conference center beginning Monday, Dec. 17. Reopening is tentatively scheduled for mid-January 2020.

The scope includes: new audio/visual equipment; improving fire egress and floor plan efficiency; installation of energy-efficient LED lighting and double-pane windows; replacement of HVAC/air handling units with an energy-efficient system located in the penthouse; individual temperature controls for each room; asbestos abatement; an expansion of the women's restroom; and improvement to the overall appearance and flexibility of the space. The area will be demolished down to the columns.

After Dec. 17, there will be no access to the C-wing 6th floor, elevators will be locked out and vending machines will be removed as well as the coffee brewing stations. Noise from demolition and core drilling will begin early but end by 9 a.m. The dumpsters at the loading dock will also be removed by 9 each morning. The freight elevator will be in constant use for demolition and deliveries. A crane may be required for window installation and new HVAC equipment. Utility shutdowns should not affect the rest of the building.

Donate Use-or-Lose Hours to NIH Leave Bank by Jan. 5

In 2017, NIH employees lost more than 75,000 hours of annual leave. Do you have use-or-lose leave? The Leave Bank offers you an opportunity to put that leave to use by donating it to the bank by Jan. 5, 2019, via ITAS. When you donate to the Leave Bank, you help a co-worker in need, like this recipient:

"Words cannot express my gratitude for the Leave Bank. My son has a very serious (and terminal) illness, resulting in many hospital stays, as well as multiple surgeries. Knowing that the Leave Bank is available gives me the peace of mind to know that remaining in pay status is something that I no longer have to worry about and that I can put all my attention and care where it should be, with my son. From our family to yours, thank you for helping us through this very difficult time."

To donate: Log in to ITAS at <https://itas.nih.gov>. On the tool bar, select "Donate to Leave Bank." Enter the type of leave (annual or restored annual). Enter the number of hours you wish to donate, then select "Ok."

More information on the program, including testimonials to the value of the bank, can be found at <http://hr.nih.gov/leavebank>. For questions, call (301) 443-8393 or email LeaveBank@od.nih.gov.



Employees Learn About Taxes, TSP

The NIH chapter of the Federal Asian Pacific American Council recently invited a federal employee benefits consultant to give a seminar on the Thrift Savings Plan and tax planning to NIH employees. About 40 people attended the seminar, which reviewed 2018 tax law changes, TSP fund allocation strategies and risk analysis. The speaker also offered retirement tips. To stay abreast of such topics, visit the NIH Office of Human Resources at <https://hr.nih.gov>.

NIH Collects Shoes, Boots for Homeless

The NIH Veterans Recruitment and Retention Force (VRF) has joined its Department of Housing and Urban Development counterpart in "Walk in Their Footsteps," a campaign to collect new boots and shoes for homeless veterans and their families. NIH will participate through Friday, Jan. 4, 2019.

In 2018, the number of veterans experiencing homelessness has increased. On any given night more than 40,000 vets are homeless, staying in emergency shelters or transitional housing programs or living in places not meant for human habitation. Many are also in need of basic clothing items. A pair of new boots or sturdy work shoes can make a difference in getting to a medical appointment, an employment interview or employment training. New socks, gloves and scarfs are also welcome.

The campaign is in need of new boots and shoes for male and female veterans in the following sizes: women's 8 to 9.5; men's 9.5 to 15.5. (Please, no dress shoes.) Due to health considerations, only new items are being accepted. Cash donations are not accepted.

Collection bins are located in several NIH buildings. See a list of drop-off sites at <http://employees.nih.gov/>. For details, contact VRF member Jill Bartholomew, (240) 276-6635.

ORWH Offers Science Policy Travel Award

The Office of Research on Women's Health is offering a Science Policy Scholar Travel Award to a junior investigator whose work focuses on women's health or sex/gender differences, as well as on policy. The award will be available to support travel to the annual meeting of the Organization for the

Study of Sex Differences (OSSD) May 5-8, 2019, in Washington, D.C.

Interested investigators should submit an abstract on a policy-related matter connected to women's health or sex/gender differences for consideration as a poster, oral session or symposium at OSSD's annual meeting. A panel of experts will review the abstracts; the author of the one chosen will receive the travel award.

Attendance at the OSSD meeting will be a unique opportunity for an investigator to network with leading scientists and clinicians working to advance sex and gender inclusion and policy. Federal employees are not eligible for the award. For details, visit https://orwh.od.nih.gov/sites/orwh/files/docs/ORWH_OSSD_Travel_Award_2018_Final.pdf.



Georgetown University Honors Volkow

Dr. Nora Volkow, director of the National Institute on Drug Abuse, was recently presented with Georgetown University Medical Center's highest honor, the *Cura Personalis* Award, which is bestowed to a

health professional who has made outstanding contributions to human health guided by compassion and service. Volkow received the *Cura Personalis* medal during the center's 11th annual convocation on Nov. 13.

A NEW 'FIELD'

Bratman Describes Science of Nature's Effects on Psychological Health

BY ELLEN O'DONNELL

The effects on people of contact with nature—whether outdoors or indoors (as from plants, photos or window views)—is an emerging field of research showing potential to help address important public health problems, said Dr. Gregory Bratman in a recent lecture in Lipsett Amphitheater.

His talk, part of NCCIH's Integrative Medicine Research Lecture Series, reflects the center's research interest in emotional well-being as an aspect of health promotion and disease prevention. Bratman, an assistant professor and the inaugural Doug Walker endowed professor at the School of Environmental and Forest Sciences, University of Washington, focuses on the ways nature experience affects human well-being, particularly mental health.

"The impacts of the natural environment on human well-being have been considered in many ways for thousands of years," he said, from landscape

aesthetics to healing gardens in hospitals to religious and spiritual traditions. People worldwide are becoming increasingly disconnected from nature as they spend up to 90 percent of their time inside buildings and vehicles. Several major trends may be associated with this: a rapid

increase in urbanization; a marked decrease in nature exposure among urban dwellers; and a rise in mood disorders, which are leading contributors to the global burden of disease and disability.

The state of the evidence on nature contact (also called nature experience or nature exposure) shows promise for a range of psychological and physical health challenges as a treatment or preventive approach, said Bratman. Those benefits are in three domains—mental health, physical health and general subjective well-being—with the amount and strength of evidence varying by topic. A few examples include reduced stress, better sleep, improved mental health, reduced diabetes and obesity and improved immune function and general health. Nature contact also holds promise as an aid for people trying to make healthier lifestyle changes.

In one of his studies, Bratman randomly assigned



Dr. Gregory Bratman (above and at left, below)


a group of 60 healthy adult volunteers to take a 50-minute walk in either of two settings: a "nature environment" containing grassland, trees and shrubs, or an "urban environment" of a busy, major street. Participants were tested before and after their walks with self-report measures for affect or mood, emotion regulation (i.e., how they thought about and controlled their feelings) and cognitive function. Compared with the urban group, the nature group, post-walk, showed significant drops in anxiety and negative affect; increases in positive affect; and improved cognitive performance on a working-memory test.

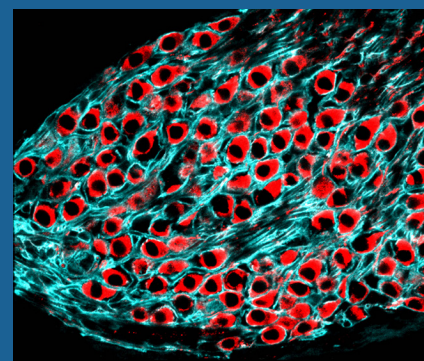
With regard to emotion regulation, Bratman has a particular interest in rumination, which he has introduced as a possible causal mechanism for some nature-contact benefits. Rumination is a process in which people repetitively think about negative aspects of themselves; it is associated with negative mood and a higher risk of depression and other psychological illnesses for some people. Bratman did a later study that was similar in design, but increased the walk to 90 minutes. His team found, post-walk and in the nature group only, decreases in self-reported rumination and in blood flow to the brain region associated with rumination (the subgenual prefrontal cortex). The urban group showed no significant changes. These exploratory studies were small and Bratman has been pursuing this line of research further.

Recently, he and several UW colleagues developed and published seven research frontiers for their field. First was mechanistic biomedical studies. "Better understanding of the mechanisms—and of the 'active ingredients' in nature contexts—will help us design and deliver benefits more effectively," Bratman said. Theories include stress reduction; restoration of directed attention, which gets taxed by urban living; immune function enhancement; promotion of physical activity; social connectedness; and superior air quality.

The authors' other recommended domains were exposure science, epidemiology, "technological nature" such as virtual reality, diversity and equity issues regarding access to nature, economic and policy studies and implementation science. The individual and cultural differences between

people with respect to nature contact is another area to study.

"This field is new, and there's a lot of work to be done," Bratman concluded. "But we can say, with some degree of certainty, that in many cases nature experience benefits mood and cognitive function for urbanites (and likely emotion regulation as well, although that is less studied). Rapid change and degradation of natural landscapes across the globe provide critical context for the application of this knowledge. In this way, we can recognize our natural systems as vital assets, account for the roles they play in supporting human psychological well-being and routinely incorporate these values in the decision-making process as we consider how to bring people to nature and nature to people." 



ON THE COVER: Section of auditory nerve in a young adult mouse. Supporting glial cells (blue) coat neuron fibers (red) and allow fast, reliable transfer of sound information from the ear to the brain. Researchers are testing whether they can target glial cells to prevent neural loss and restore hearing.

IMAGE: HAINAN LANG, MEDICAL UNIVERSITY OF SOUTH CAROLINA (NIH SUPPORT FROM NIDCD)

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Bluebirds

CONTINUED FROM PAGE 1

architect, in a recent note to birdhouse monitors. “Now, that’s not a very high number but according to...past statistics, the last time we had bluebirds fledge on campus was 2013.”

That’s good news for the Office of Research Facilities’ effort to control the Bethesda campus’s pests without spraying insecticides. The idea, the brainchild of Hartz’s predecessor Lynn Mueller, was to attract small birds (and bats) whose natural diet included mosquitoes and other potential disease-carrying insects.

The novel solution to pest control began more than 18 years ago, in spring 2001, when NIH grounds maintenance crews installed more than 30 birdhouses and several bat houses in strategic locations throughout the property. In the year or so before then, reports surfaced of the possibility of West Nile virus potentially threatening the campus and vicinity via the warm weather mosquito population. Mueller and company sought to head off any such invasion.

In the nearly two decades since, the avian housing project has mostly thrived, attracting a variety of enthusiastic pest eaters.

In addition to bluebirds, “we had the usual suspects show up again this year—chickadees, wrens and tree swallows,” Hartz reported. “In total, we had 166 desirable native cavity-nesting birds fledge out of the 99 boxes on the 8 trails in Bethesda. The number of boxes is down a bit because of ongoing construction. I’m hopeful we can get some new boxes put up before next year’s

★ ★ ★

“In total, we had 166 desirable native cavity-nesting birds fledge out of the 99 boxes on the 8 trails in Bethesda.”

—BRANDON HARTZ

★ ★ ★

season, if those construction projects finish up over the winter.”

After the 33 houses put up that first season, more have been added over time, peaking at 106 in 2015. The year before had seen a sizable influx of wrens and chickadees. Top years for bluebirds taking up residence were 2005-2006 and 2011-2012.

Unfortunately, Hartz pointed out, the bird bungalows have also caught the attention of less-desirable tenants—house sparrows. The bigger, more aggressive birds bully the mosquito eaters and take over the nesting sites. Even the normally mild-mannered tree swallows have been known to be confrontational, though, chasing off Hartz and crew a time or two when the humans ventured a little too close to the birds’ temporary quarters.

It’s the Circle of Life, of course, for the sparrows to go after the smaller birds, but predator fowl thwart the mosquito-combat strategy. Hartz and his crew have been forced to try and block out larger birds by narrowing the house entrances with mesh and wire.

“As a ratio of fledgling to box, the campus saw 1.5 fledglings for every box,” Hartz said. “Fifteen years ago in 2003, for comparison, we had just over one fledgling per box. So we

are housing more birds than in the past. The biggest change noticeable in the past 15 years has been the shift in nesting species from bluebird to tree swallow.”

A longtime lead designer of outdoor sustainable environments who earned his master’s degree in landscape architecture from Harvard, Hartz employs methods that naturally fit NIH. He takes time to collect information, study conditions from several angles and then draw data-driven conclusions.

“Looking at the previous years’ data, as well as some visuals that help to show this species shift,” he explained in his update to birdwatchers, “one has to conclude that the increasing developmental footprint and squeezing out of green space is having a major effect on the wildlife on the Bethesda campus. For comparison, Poolesville, which is basically open pasture land, has only 55 boxes but fledged a whopping 72 bluebirds!”

Hartz’s note also acknowledged “an information gap in 2016 to 2017.” That’s when Mueller retired in late 2015 and the position was vacant for a while before Hartz joined and learned the birdhouse ropes.

Now that the project is picking up speed again, recruitment is underway for more



At top left, a tree swallow rests on a bluebird box near Natcher Bldg. Above, Alexander “A.J.” Mueller monitors a bluebird box by the Stoney Creek Pond.

PHOTOS: HALUK RESAT, BRANDON HARTZ

Tool Helps Children Cope with Painful Procedures

BY ADRIENNE BURROUGHS

“I’m a firm believer that practice to research to practice is what we’re all about in nursing,” said Dr. Ann Marie McCarthy during a recent NINR Director’s Lecture. Her work is a prime example of how clinical practice informs research questions, leads to development of interventions and improves patient care by implementing those interventions.

While working as a pediatric nurse, McCarthy saw first-hand how distressing painful medical procedures are to young patients. Such procedures are common, with an average of 9 to 10 of them occurring every day on every child in a pediatric intensive care unit.

McCarthy is a professor and associate dean for research at the University of Iowa College of Nursing, with secondary appointments in the colleges of medicine and public health. The various roles she has had during her career, from staff nurse to nurse practitioner to psychologist to researcher, influenced her work and led her to her passion: identifying evidence-based methods to predict children’s distress during medical procedures and interventions to decrease that distress.

McCarthy discovered during one of her early studies that when families were provided with a package of materials to use during their child’s painful procedure, they only used the distraction tools and not the other materials they were given. Distraction draws children’s attention away from painful stimulus and engages the child in playful activities. McCarthy notes, “When you have divided attention, nothing is as extreme as if you’re totally focused on one thing.”

McCarthy and her team created the Distraction in Action Tool, a web-based tool for families and providers that will identify a child’s risk for distress and provide guidance on how to reduce that distress. The tool kit includes the predictive model, training videos, tips for parents and providers, individualized recommendations and distractors—links to books and games. McCarthy used results of several studies, including a behavioral analysis of what happens during a painful procedure between the parent and the child, to develop the tool kit. Along the way, her team developed a distraction coaching index and discovered genetic differences in how children feel pain when a topical anesthetic is used.

The Distraction in Action Tool is available on the University of Iowa Stead Family Children’s Hospital website, along with information and resources for parents: <https://uichildren.org/distraction-in-action>.

The NINR Director’s Lecture Series is designed to bring the nation’s top nurse scientists to NIH to share their work and interests with a trans-disciplinary audience. McCarthy’s lecture is available on NINR’s YouTube channel at <https://www.youtube.com/watch?v=VmcedkLJIEI>.

DISTRACTION IN ACTION



A bluebird nest with four eggs in a bluebird box outside the Safra Family Lodge


PHOTO: JANET GAMSON

folks to help monitor the houses regularly. About 20 volunteers from all across campus walk the 8 trails, usually in duos, checking on nesting habits, noting bird residents and sometimes even capturing snapshots of wildlife.

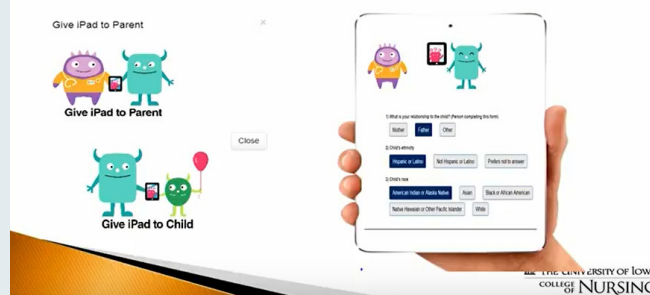
Several NIH’ers are long-time veteran monitors: The two longest-tenured bluebird box volunteers are Michael Bopf and Mary Herron, both of NLM. Bopf started in 2006; Herron’s been at it since 2007. NIH retiree Dr. John Newman, now an NICHD volunteer, monitors bird boxes on NIH’s farm up in Poolesville.

Hartz, along with summer intern Alexander Mueller (yep, that Mueller—“A.J.” is following in dad’s footsteps, literally), made up another team of regular Bethesda monitors this past season. Still, it would help with data collection to add a few more next spring, so that vacations, scheduling conflicts and other breaks in service are covered.

“I so very much appreciate all of the time and effort that you all put in on a volunteer basis,” Hartz said in the email report to monitors. “Ideally, these numbers will help us do an analysis to see where we’re having success and where we’re not, which specific trails are attracting the birds we want and which houses may need to be moved to better locations.”

Email brandon.hartz@nih.gov at any time, if you want to volunteer or learn more about requirements for monitoring. 

Distraction in Action Tool Kit First: Predictive Model-- The parent and child answer questions





Talented NIH'ers (from l) take the stage—CIT's Tyrone Steele brings down the house with his rendition of *End of the Road*. NLM's Moira Lee earns 10s from all three judges for this feat of strength, flexibility and balance. NCATS director Dr. Christopher Austin sang opera and won first place. NICHD director Dr. Diana Bianchi sings while colleagues hula-hoop their way through Abba's *Dancing Queen*.

PHOTOS: MARLEEN VAN DEN NESTE

Talent Show

CONTINUED FROM PAGE 1

Guantanamo, accompanied by Dr. Juliet Pena on the harp. CIT's Tyrone Steele wowed the crowd with his rendition of the Boyz II Men hit *End of the Road*.

Several performers used their 2 minutes of stage time to encourage CFC giving. NIGMS's Dr. Peter Preusch and Tony Baum customized lyrics for *Fiddler on the Roof's If I Were a Rich Man*, earning high marks from the judges. The Monkees' 1960s hit *I'm a Believer* was transformed into "I'm a Donator" thanks to the creativity of the "NIBIBelievers" Dr. David George, Todd Merchak and James Huff.

But just like the TV show that inspired it, NIH's Got Talent featured more than music.

A skit by Clinical Center staff celebrated the military via an ode to the former services of its three performers: hospital CEO Dr. James Gilman, Executive Officer Colleen McGowan and Mike Delostrinos of the Office of Administrative Management. NIMH

director Dr. Joshua Gordon and NINDS director Dr. Walter Koroshetz were wryly amusing in their pre-recorded video segment that riffed on the hit TV series *The Office*. There was even a women's épée gold medal fencing bout featuring NHGRI's Dr. Bettie Graham, Ellen Rolfes and Emily Neveux.

While these and all other acts were entertaining and conducted in the spirit of raising awareness about the importance of CFC giving, ultimately the judges selected the top winners. Third-place went to Koroshetz and NINDS deputy director Dr. Nina Schor—The Oligos—who mesmerized the audience with an original number called *The Mighty Brain*. The Oligos also won "Fan Favorite" from a panel of voters consisting of two staff members from each NIH IC.

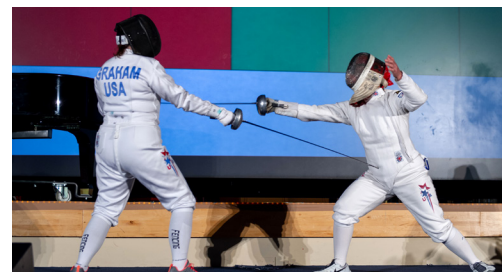
NLM's Moira Lee, who earned the sole perfect score from the three celebrity judges, was presented with the second place award for her breathtaking acrobatic demonstration of strength and flexibility that left the audience in awe.

The first place award—IC director participation meant added points—went to NCATS director Dr. Christopher Austin for his powerful performance of a selection from the opera *Carmen*, delivered in full period regalia.

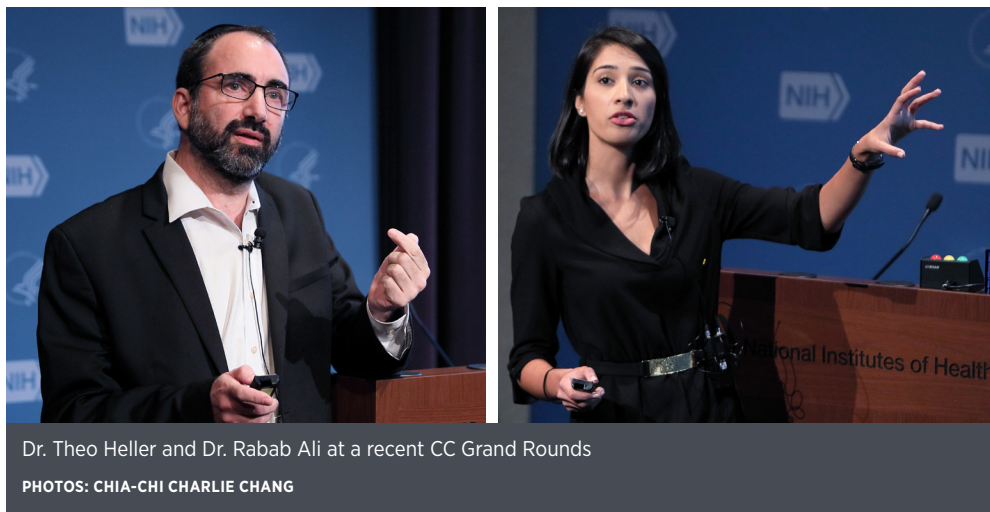
NCATS is the lead IC for this year's CFC, so Austin remained in the spotlight to conclude the variety show.

"There was considerable anxiety among potential performers when I announced an NIH's Got Talent for this year's CFC Directors' Challenge," Austin said. "But the ICs outdid themselves without exception and showed the amazing spirit and enthusiasm that makes NIH so special. I hope the performances inspire everyone to give generously to the CFC so that we can hit our \$2.2 million goal."

Consider donating today at <https://cfc.nih.gov/> and watch the entire NIH's Got Talent event at <https://videocast.nih.gov/summary.asp?live=28941&bhcp=1>.



FROM LEFT: Undertaking their responsibilities with all due seriousness are "celebrity" judges (from l) Dr. Lawrence Tabak, Dr. Maria Freire and Dr. Alfred Johnson. Third-place went to NINDS director Dr. Walter Koroshetz and deputy director Dr. Nina Schor—The Oligos—who mesmerized the audience with *The Mighty Brain*. There was even a women's épée gold medal fencing bout from NHGRI.



Dr. Theo Heller and Dr. Rabab Ali at a recent CC Grand Rounds

PHOTOS: CHIA-CHI CHARLIE CHANG

CC Researchers Begin to Unravel Mysteries of Liver Diseases

BY ERIC BOCK

Liver diseases such as hepatitis B and C affect millions of people, explained Dr. Theo Heller during a recent Clinical Center Grand Rounds lecture in Lipsett Amphitheater.

“The impact on society is significant,” said Heller, a senior investigator and chief of the NIDDK Liver Diseases Branch’s translational hepatology section.

The liver’s responsibilities include making proteins that are essential for blood clotting and filtering blood that comes from the digestive tract, removing toxins from the bloodstream and storing energy.

At the Clinical Center, Heller is studying why liver diseases progress and how progression varies in individual patients. Patients with hepatitis C, for instance, first develop inflammation, then cirrhosis, a condition where scar tissue replaces normal liver tissue and, finally, end-stage liver disease with or without liver cancer. HIV, alcohol dependence or diabetes can accelerate liver disease progression. The exact mechanisms of progression aren’t clear.

“We’re not understanding what came into the liver and what might affect the development of liver disease,” he noted.

The portal vein might hold clues. It moves blood from the gastrointestinal tract, gallbladder, pancreas and spleen to the liver. Getting to the vein is difficult because of its location. It’s one of two places in the body—the other is the brain—where radiologists cannot thread a catheter by traditional methods. Heller likened the portal vein to the dark side of the moon, both of which are largely unexplored.

In one clinical trial at the CC, his lab studied the portal vein in 29 patients with hepatitis C. Some patients had portal hypertension. The researchers took liver tissue and portal blood samples and studied patients’ inflammation, immune system, microbiome and metabolism. The patients were also enrolled in a study that treated their hepatitis C.

“We were analyzing the data in real time and we

understood we had a problem,” Heller explained. “These patients had hepatitis C, portal hypertension, fibrosis and inflammation. How do you tease apart all these different things?”

A postdoctoral fellow in his section, Dr. Rabab Ali, suggested they run the exact same tests once all the patients cleared their hepatitis C infection. Once the patients recovered, Heller and Ali invited them back for additional testing.

Twenty-four patients from the first clinical trial returned. After the study’s completion, Heller’s lab had much data to analyze. They began searching for markers that predict liver disease.

Ali said lipid and bile acid metabolism change over the progression of the disease.

Patients with liver fibrosis had higher levels of free fatty acids in their portal blood. Ali speculated that this may be for many reasons including as a source of energy for the “metabolically stressed liver” or for certain types of immune cells. Some macrophages, for example, use fatty acids.

Patients with advanced liver disease have abnormal bile acid profiles compared to a person without liver disease. Bile is produced by the liver and helps break down fats and water-soluble vitamins. Once the fats and vitamins are broken down, the digestive system takes them in. There are also bacteria found in the gut microbiome that play a role in bile acid metabolism, she said.

There are receptors in the liver that bind to different types of bile acids. The receptors behave differently in patients with advanced liver disease. “These receptors are being used as targets for drugs,” she explained.

The research taking place at the CC couldn’t happen anywhere else, the speakers agreed. “We have a unique environment at NIH,” Heller said. “We don’t just have an opportunity to take the road. We can lay down the road.” **R**

Two from NIH Rehabilitation Medicine Honored

Two physicians from the Clinical Center’s rehabilitation medicine department (RMD) were recognized by the American Academy of Physical Medicine and Rehabilitation (AAPMR) at its recent annual assembly in Orlando.

Dr. Naomi Lynn Gerber, former head of RMD and now a special volunteer at NIH, was presented with the Frank H. Krusen, MD, Lifetime Achievement Award, the academy’s highest honor. It was established in 1972 in honor of the founding father and fourth president of the academy.

Gerber is a professor at George Mason University in the department of health

administration and policy and director of research in the department of medicine at Fairfax Hospital Inova Health System. She is also chair of the rheumatology section at the Inova Health System and primary investigator at the Center for the Study of Chronic Illness and Disability at George Mason University.

A member of the National Academy of Medicine, Gerber was recognized for many significant contributions in patient care, education and research.

Also honored was Dr. Scott Paul, RMD senior staff clinician and medical staff section research coordinator. He has been a member of AAPMR’s pediatric rehabilitation/developmental disabilities council since 1991 and was the first treasurer of its resident physician council. He has served on multiple academy committees and task forces and in several editorial roles.



Dr. Naomi Lynn Gerber and Dr. Scott Paul



Clock genes

CONTINUED FROM PAGE 1

Nobel Laureate Lecture on Oct. 17 in Masur Auditorium.

There are several subtle indicators of the clock in nature, he said. One example is the bee dance. Austrian naturalist Karl von Frisch first observed that honey bees dance to communicate the location of food to other bees. He found two dances: the round and the waggle dance.

The round dance alerts other bees to food sources close to the bee hive while the waggle dance tells others food is farther away from the hive. Even though the inside of the hive is dark, the orientation of the dance changes as the sun changes position.

“Something very similar to this happens with migrating monarch butterflies,” he said. The butterflies have circadian clocks located in their antennae. The antennae also have photoreceptive proteins inside them. Once the antennae sense light, they spur a biological process that allows them to tell time of day. They use these clocks to navigate. Painting the antenna black will disorient the insect.

Regions in the mammalian brain’s hypothalamus called the suprachiasmatic nuclei (SCN) control circadian locomotor rhythms,

Young explained. The metabolic activity of the SCN oscillates with day/night changes.

There are several “clock” genes associated with circadian rhythms. Along with two researchers at Brandeis University, Dr. Jeffrey C. Hall and Dr. Michael Rosbash, Young first located and characterized several of them at the molecular level in the fruit fly, *Drosophila*. One is called *per* (period). Mutations in this gene can shorten, lengthen or eliminate the circadian rhythm. The gene encodes a protein called PER. During the night, the protein builds up in cells. During the day, the protein breaks down in cells.

A few years later, Young identified a second gene, called *timeless*. The gene encodes a protein called TIM. The two proteins, PER and TIM, would seek each other out. Once they found each other, they combined and entered a cell’s nucleus. After the proteins entered the nucleus, they blocked further PER and TIM production. Then, the cycle repeated. Several more clock genes have been identified since.

When people travel long distances over a short period of time, such as a flight from New York to Tokyo, they experience jet lag. The condition interferes with the body’s circadian rhythms, by adjusting clocks in many different tissues. Young said the SCN in the brain is among the first to adjust to a new



Institutes of Health

Young describes his lab’s current study of patients with delayed sleep phase disorder, a condition where a person’s sleep is delayed by at least 2 hours beyond a normal bedtime.

PHOTOS: CHIA-CHI CHARLIE CHANG

time zone. The circadian clocks in different cells adjust at different schedules.

“The peripheral clocks would lag, and they would lag to different degrees. The liver was one of the slowest to fully adjust,” Young said.

Currently, his lab is studying patients with delayed sleep phase disorder (DSPD), a condition where a person’s sleep is delayed by at least 2 hours beyond a normal bedtime. Consequently, those with the syndrome have a hard time waking up in time for work or other morning activities. This happens day after day in an adult’s life. There are treatments, but they aren’t very effective.

“The best guess is about 5 percent of the population suffers from this sleep pattern,” Young said. “It’s very resistant to efforts to advance sleep.”

DSPD sometimes runs in families. Recently, his lab discovered a mutation in the cryptochrome-1 gene. They found the mutation after they studied DNA from a patient with the disorder. The patient mentioned others in her family who had difficulty sleeping. Young’s lab reached out and found other members with the mutation. Currently, his lab is working with a researcher from Turkey to study the condition in several families.

“Thanks yet again to the fruit fly,” Young concluded. Without *Drosophila*, he would never have been able to conduct human studies. **R**



Young chats with lecture attendees at a reception in the NIH Library.

NIH To Evaluate Effectiveness of Male Contraceptive Skin Gel

A clinical trial funded by NIH will evaluate a male contraceptive gel for its ability to prevent pregnancy. The gel formulation was developed by the Population Council and NICHD. The Population Council will collaborate with NIH to conduct the study in NICHD's Contraceptive Clinical Trials Network.

"Many women cannot use hormonal contraception and male contraceptive methods are limited to vasectomy and condoms," said study investigator Dr. Diana Blithe, chief of NICHD's Contraceptive Development Program. "A safe, highly effective and reversible method of male contraception would fill an important public health need."

The gel formulation, called NES/T, includes the progestin compound segesterone acetate (brand name Nestorone), in combination with testosterone. It is applied to the back and shoulders and absorbed through the skin. The progestin blocks natural testosterone production in the testes, reducing sperm production to low or nonexistent levels. The replacement testosterone maintains normal sex drive and other functions that are dependent on adequate blood levels of the hormone.

Researchers plan to enroll approximately 420 couples into the study. Male volunteers will use the NES/T gel daily for 4 to 12 weeks to determine whether they tolerate the formulation and to ensure they do not experience unacceptable side effects. If sperm levels have not adequately declined, they will continue to use the formulation for up to 16 weeks.

Once their sperm levels have declined to a threshold sufficient for contraception, they will enter the efficacy phase, which will evaluate the ability of the formulation to prevent pregnancy. This phase will last for 52 weeks and the couple will rely on the male partner's application of the gel as the sole method of contraception.

Males will remain in the study for observation for an additional 24 weeks after they discontinue the formulation.

The study will be conducted at UCLA and the University of Washington.



A clinical trial will evaluate a male contraceptive gel, which is applied to the back and shoulders and absorbed through the skin.

IMAGE: COURTNEYK/GETTY IMAGES

Clinical Trial of Ebola Treatments Begins in DRC

An international research team has begun patient enrollment in a clinical trial testing multiple investigational Ebola therapies in the Democratic Republic of the Congo (DRC). The randomized, controlled trial is enrolling patients of any age with confirmed Ebola virus disease (EVD) at a treatment unit in the city of Beni operated by the Alliance for International Medical Action, a medical humanitarian organization.

The trial, which will expand to additional DRC districts, is organized through an international research consortium coordinated by the World Health Organization. It is led and funded by an arm of the DRC ministry of health and NIAID and also involves several additional international partners.

"Combating Ebola requires a comprehensive response that draws on the strengths of all areas of public health," said NIAID director Dr. Anthony Fauci. "Biomedical research can lead to critical new tools, such as potentially life-saving therapies. Through scientifically and ethically sound clinical trials, we hope to efficiently and definitively establish the safety and efficacy of these investigational Ebola treatments, offering new ways to save lives."

On Aug. 1, the DRC ministry of health declared the country's 10th outbreak of EVD. As of Nov. 25, 240 deaths out of 419 confirmed and probable cases of EVD have been reported in the northeastern provinces of North Kivu and Ituri. Under the leadership of the ministry, WHO has coordinated the outbreak response with several international partners. NIAID, along with the CDC, the U.S. Agency for International Development and other U.S. government partners, has provided guidance and support to the multi-sectoral outbreak response.

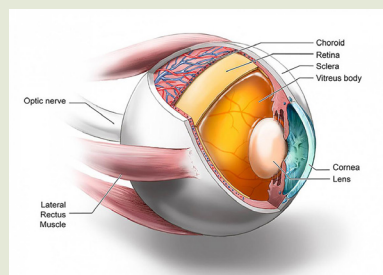
"We urgently need a safe and effective treatment for this deadly disease," said DRC minister of health Dr. Oly Ilunga Kalenga. "As we face a 10th outbreak of Ebola, we hope this clinical trial will give us more information about how best to treat patients."

Eyes of CJD Patients Show Evidence of Prions

NIH scientists and their colleagues have found evidence of the infectious agent of sporadic Creutzfeldt-Jakob disease (CJD) in the eyes of deceased CJD patients. The finding suggests that the eye may be a source for early CJD diagnosis and raises questions about the safety of routine eye exams and corneal transplants. Sporadic CJD, a fatal neurodegenerative prion disease of humans, is untreatable and difficult to diagnose. Results were reported in *mBio*.

Prion diseases originate when normally harmless prion protein molecules become abnormal and gather in clusters and filaments in the body and brain. Scientists hope that early diagnosis of prion and related diseases—such as Alzheimer's, Parkinson's and dementia with Lewy bodies—could lead to effective treatments that slow or prevent these diseases. Scientists from NIAID collaborated on the research with colleagues from the University of California at San Diego and UC-San Francisco.

About 40 percent of sporadic CJD patients develop eye problems that could lead to an eye exam, meaning the potential exists for the contamination of eye exam equipment designed for repeat use. Further, cadaveric corneal transplants from undiagnosed CJD patients have led to 2 probable and 3 possible cases of disease transmission, the researchers say.



Ocular tissues tested by real time quaking-induced conversion

IMAGE: RYAN KISSINGER, NIAID

Previous studies have shown that the eyes of CJD patients contain infectious prions, though the distribution of prions among the various components of the eye was not known. To address this question, the scientists recruited 11 CJD patients who agreed to donate their eyes upon death. The researchers found evidence of prion infection throughout the eyes of all 11 deceased patients using real time quaking-induced conversion

(RT-QuIC), a highly sensitive test NIAID scientists developed that detects prion seeding activity in a sample as evidence of infection.

The RT-QuIC test is used in clinical settings to diagnose sporadic CJD in people. The researchers will continue their work to evaluate accessible eye components or fluids as feasible diagnostic testing sources. They also plan to use other RT-QuIC tests to evaluate the eyes of patients with Alzheimer's, Parkinson's and dementia with Lewy bodies to determine whether infectious proteins from those disease processes are present.

NIDA's Rapaka Earns Two Lifetime Achievement Awards

NIDA's Dr. Rao Rapaka was honored with two awards for his dedicated support and significant contributions to research and development related to drug abuse.

He received a 2018 Hall of Fame award from the Society for Chemistry and Pharmacology of Drug Abuse (SCPDA) and the Life Achievement Award 2018 from the Society for Personalized Nanomedicine.

Both of these organizations have wide membership and a strong focus on the field of drug abuse research and development. In honoring Rapaka, both echoed a common theme, recognizing Rapaka's untiring dedication and visionary outlook in forging new directions for research in drug abuse. They cited his vision in bringing cutting-edge advances



Dr. Rao Rapaka

in fields of lipidomics, structural biology and chemistry to bear on research in drug abuse, in addition to his passion for mentoring scientists, paving the way to seminal discoveries in new approaches, targets and medications in development for drug abuse pharmacotherapy.

Rapaka is chief of the Chemistry, Pharmacology and Physiological Systems Research Branch in the Division of Neuroscience and Behavior. He is a fellow of the American Association for the Advancement of Science and the American Association of Pharmaceutical Sciences. Rapaka has received several other awards from national and international societies including the International Cannabinoid

Research Society, American Peptide Society, International Narcotic Research Conference and the College on Problems of Drug Dependence.

NINR Hosts Workshop on Rural Health Disparities

The National Institute of Nursing Research, together with partners from across NIH, recently held a workshop on the "State of Rural Health Disparities: Research Gaps and Recommendations."

It examined the state of research on rural health disparities and provided an opportunity for scientists and health advocates to come together to catalyze and shape the future research agenda for this critical area.

The workshop targeted health promotion and disease prevention, approaches to managing chronic conditions and environmental influences, including technology.

Surgeon General Jerome Adams, Deputy Surgeon General Sylvia Trent-Adams and NINR director emeritus Dr. Patricia Grady opened the workshop and set the tone for discussion by national experts.



Attending the workshop were Surgeon General Jerome Adams (l), NINR director emeritus Dr. Patricia Grady (c) and Radm. Sylvia Trent-Adams, deputy surgeon general.



NIH communicator Geoffrey Spencer will be remembered for his wit, humor and candor.

NCATS Mourns Communicator Spencer

Geoffrey Spencer, 46, an accomplished and colorful NIH communications professional, died Oct. 27 due to complications from adrenomyeloneuropathy, a rare, incurable, genetic neuro-degenerative disorder.

Spencer joined the NCATS Communications Branch as a public affairs specialist in February 2012. His primary responsibilities included but were not limited to helping lead and organize the

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"Geoff... was simultaneously as smart and caring as he was brash and hilarious, a combination of traits that endeared him to me and to so very many others."

-DR. CHRISTOPHER AUSTIN

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annual Rare Disease Day at NIH, as well as the production of NCATS' rare disease patient videos and serving as the day-to-day point of contact for the center's intramural, rare disease, tissue chip and other programs. In this role, he also produced content for news releases, social media and the NCATS website.

Spencer began his NIH career in 1999 as a public affairs assistant at NHGRI, where he was the primary media relations contact for the institute and its director at the time, Dr. Francis Collins.

Eventually becoming the associate director of communications for the Division of Extramural Research, he was responsible for promoting more than 20 projects that followed the completion of the Human Genome Project, including The Cancer Genome Atlas, the Encyclopedia of DNA Elements, the 1000 Genomes Project, the NHGRI Large-Scale Genome Sequencing Program and the Advanced DNA Sequencing Technology Program.

NCATS director Dr. Christopher Austin said, "I first had the opportunity to work with Geoff while at NHGRI. There, as at NCATS, he was simultaneously as smart and caring as he was brash and hilarious, a combination of traits that endeared him to me and to so very many others."

Spencer earned a bachelor's degree in communication arts in 1999 from Salisbury University. He also served in the U.S. Army from 1991 to 1995, achieving the rank of specialist.

Born in Newport News, Va., he lived in Silver Spring with his wife Amy and a plethora of rescue dogs and cats. Spencer also enjoyed long-distance cycling and was a connoisseur of alternative, new wave and punk rock music. He will be remembered as an outspoken and passionate professional by all whose lives he touched. No one will ever forget his acerbic wit and somewhat risqué vocabulary, which was as spicy as the hot sauces of which he was so fond.

He is survived by his wife, Amy; mother, Patricia; and two sisters, Jennifer and Nicole.

NCI Scientist Bliskovsky Mourned

Dr. Valery Bliskovsky, a staff scientist in the Genomics Core of NCI's Center for Cancer Research, died on Nov. 13, in the aftermath of a heart attack suffered while swimming. He was 55 years old.

Bliskovsky obtained his Ph.D. in biochemistry from Moscow State University. He began his NIH career in 1994 as a visiting fellow in NCI's Laboratory of Biological Chemistry and then moved in 1996 to the Laboratory of Genetics under Dr. Beverly Mock, which later became a part of the Laboratory of Cancer Biology and Genetics (LCBG).

In 2012, in close cooperation with CCR's Genomics Core and the Office of Science and Technology Resources, Bliskovsky initiated Next Generation Sequencing (NGS) operations to bring NGS capabilities to principal investigators at CCR and NIH. This effort provided NGS services locally in direct interactions with researchers and clinicians to gain NGS-related experience and helped labs set up their own NGS capabilities.

In April 2015, Bliskovsky officially transitioned LCBG into the CCR Genomics Core and Genetics Branch.

The core's facility manager, Dr. Liz Conner, noted, "Val served as our genomics expert. His love of science and of people has been echoed by every single person who has reached out to me after learning of this tragedy."

To his coworkers, he "was a collaborator and friend full of ideas that helped advance our research at a rapid pace." Bliskovsky was known for his wit, humor and Russian anecdotes. He was also famous for being incredibly active; he always took the stairs, walked everywhere and swam every day. Through this active lifestyle, he made many connections and memories at his local pool.

The family asks that friends send memories (large and small) and photos to memorie-sofvaleri@gmail.com at any point in time and in any language.

Bliskovsky is survived by his son, Alexander, daughter, Alla and mother, Alla Lein. 



NCI's Dr. Valery Bliskovsky

Do You Have a Food Allergy?

NIAID researchers are seeking volunteers age 2 and older who have at least one food allergy to participate in a study to better understand how food allergies affect health. Participants receive a comprehensive nutritional evaluation and meet with a dietitian for individualized counseling. Compensation for participation is provided. For more information, contact the Clinical Center Office of Patient Recruitment at 1-866-444-2214 (TTY 1-866-411-1010) or email prpl@cc.nih.gov. Read more at <https://go.usa.gov/xQYw9>. Refer to study 15-1-0162.

Patients with SAA, MDS Needed

NHLBI researchers are testing ways to make stem cell transplant safer and more effective in people with severe aplastic anemia (SAA) and myelodysplastic syndrome (MDS). For more information, call the Clinical Center Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read more online at <https://go.usa.gov/xQcgz>. Refer to study 17-H-0091.

HIV Vaccine Study Needs Subjects

Vaccine Research Center researchers seek persons 18-60 years old who are living with HIV for a research study. The study evaluates an investigational product targeting the HIV virus to determine if it is safe and can generate an immune response. Compensation is provided. For more information, call 1-866-833-5433 or email vaccines@nih.gov. Read more online at <https://go.usa.gov/xQGp2>. Se habla español.

NHLBI Study Recruits Volunteers

NHLBI invites volunteers ages 18-80 of African descent with or without sickle cell trait and patients with sickle cell disease to participate in a one-time visit research study. Volunteers will provide blood samples that will be used to look for a link between the PKLR gene and pyruvate kinase protein. The PKLR gene is active in the liver and in the red blood cells and helps to create protein called pyruvate kinase that is essential in normal functioning of the red blood cells. Compensation is provided. For more information about study 18-H-0146, call 1-866-444-2214 (TTY 1-866-411-1010) or visit <https://go.usa.gov/xP8Hx>.

Healthy Volunteers Needed for Vaccine Study

Vaccine Research Center researchers seek healthy volunteers, 18-70 years old, for an investigational influenza vaccine study. Scientists are testing new vaccines to determine if they are safe and effective in preventing the flu. Compensation is provided. For more information, call 1-866-833-5433 or email vaccines@nih.gov. Read more online at <https://go.usa.gov/xNH7U>. Refer to study VRC 316.

NEI Tops Off 50th Anniversary By Peering into Future

BY KATHRYN DEMOTT

Capping off a year of events commemorating its 50th anniversary, the National Eye Institute recently hosted the “Future of Vision Research,” a symposium featuring a glimpse at what the next 50 years in vision research may bring.

“Tremendous advances in regenerative medicine are coming quickly,” said NEI director Dr. Paul Sieving. “Building on these advances will require new functional imaging and computational tools to help us further our understanding of how the eye and the visual system work.”

California Institute of Technology neuroscientist Dr. Doris Tsao described her work to crack the code by which the brain sees visual objects. She considers faces to be a kind of Rosetta stone for decoding how the brain recognizes objects. About 15 years ago, using functional magnetic resonance imaging, she discovered “face patches” in the brains of macaques, referring to six regions within the primate’s brain that lit up when they were shown faces.

She has since discovered that a mere 200 neurons are required to parse the variables of any face. “People often say a picture is worth a thousand words, and I would add ‘or 200 neurons,’” Tsao said.

As for the future, she said that the biggest challenge will be understanding the active aspect of vision. That is, “what we see

Bharti, a Stadtman investigator and head of the NEI unit on ocular and stem cell translational research.

The tissue can also be grown on a biodegradable scaffold to replace areas of the retina that die in diseases such as age-related macular degeneration, a leading cause of blindness among people age 65

back of the eye appear blurry.

To overcome the distortion problem, Tam turned to adaptive optics. Initially developed to improve the resolution of land-based telescopes, adaptive optics uses deformable mirrors and computer-based algorithms to compensate for distortions to light as it travels through the atmosphere.



Investigators (from l) Dr. Doris Tsao, Dr. Kapil Bharti and Dr. Johnny Tam speak at a symposium offering a glimpse of what the next 50 years in vision research may bring.

PHOTOS: BRUNA GENOVESE

and older. Plans are underway to launch a clinical trial of the replacement cell therapy to treat patients with geographic atrophy, the “dry” form of AMD.

For studying diseases, there’s no substitute for watching cells interact and function with each other, noted Dr. Johnny Tam, Stadtman investigator and head of the

Using the same idea to correct distortions to light as it travels through the eye, Tam is able to visualize never-before-seen details about the cells in retinal tissue at the back of the eye.

“You turn on adaptive optics and now you see details that you didn’t see before,” he said. With this new view, scientists can study diseases at the cellular level. It opens up a new window on exploring how to potentially stop or reverse disease progression.

Other speakers included Dr. Sheila Nirenberg of Weill Cornell Medicine, who founded Bionic Sight, which develops prosthetic devices to restore sight to patients with retinal degenerative diseases; Dr. Sebastian Seung of Princeton University, who applies deep learning and crowdsourcing to reconstruct neural circuits from high-resolution images; and Dr. Aaron Lee of the University of Washington, who applies artificial intelligence to advance retinal imaging.

The symposium can be viewed at <https://go.usa.gov/xPAet>.

“What we see depends not only on what’s falling on the retina, but also on our internal knowledge and expectations.”

-DR. DORIS TSAO

depends not only on what’s falling on the retina, but also on our internal knowledge and expectations.”

On another front, researchers at NIH are growing 3-D models of eye tissue to study how eye diseases start and to test potential treatments, said Dr. Kapil

NEI clinical and translational imaging unit. But conventional technologies for studying cellular-level detail in the eye of a living person are limited by distortions to light as it passes through the eye’s cornea, lens and the vitreous gel in the center of the eye. Even at high magnification, the cells at the