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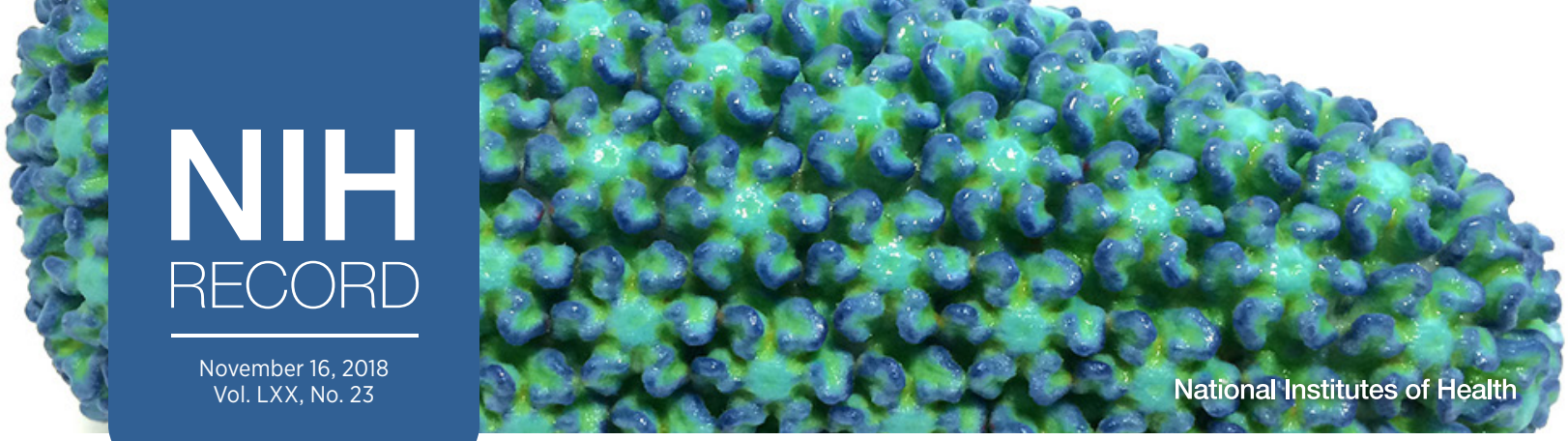


WHAT FLATWORMS TEACH US

Stetten Lecturer Urges Science 'Go Out, Discover New Biology'

BY CARLA GARNETT

At first glance, the planarian flatworm isn't much to see. But its body—often a dull, mottled gray, vaguely arrow-shaped 15-millimeter squiggle, topped with two eyes that frequently appear crossed—holds a super power any other organism would envy. Planarians can regrow themselves, wholly or in part. Sliced in half, in quarters. Diced, even—same story. The loose fragments will each regenerate any of its missing elements—head, tail and any organ or system in between—and be completely like new, only multiplied.

Dr. Alejandro Sánchez Alvarado

It's that capability that fascinates HHMI investigator Dr. Alejandro Sánchez Alvarado and his team at Stowers Institute for Medical Research. An NIGMS grantee since 1998, when he established his lab, Sánchez Alvarado discussed "Understanding the Source of Regenerative Ability in Animals," the 2018 Dewitt Stetten Jr. Lecture on Oct. 10 at NIH.

Humans are distant cousins of planarians and several other organisms that can regenerate, argued Sánchez Alvarado. What might flatworms teach us about our own innate potential to heal ourselves?

"It's very important to understand where we all come from," he said. "One of the major issues associated with our understanding of biological processes—particularly developmental biology—is there's an immense diversity of animals that appear to have shared common ancestry. We don't understand how, from that common ancestry, they have developed this immense number of

SEE **REGENERATION**, PAGE 6

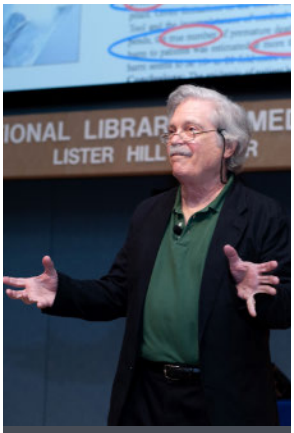

Winning is special for NLM athlete; see p. 3.

ALSO THIS ISSUE

'Blind' Man Gazes into Future

BY RICH MCMANUS

The most reliable assurance of a successful, and healthy, future is to send emissaries—our children—to that far-off place who are armed with education, grounded in reality and disciplined enough to work toward the brighter angels of their imaginations.



Dr. Alan Kay at NLM

So argued one of the people responsible for our current reality, at least as far as technology is concerned: Dr. Alan Kay, one of the pioneers of graphical user interfaces and

SEE **KAY**, PAGE 4


Crystal Emery (r) with EDI's Kay Johnson Graham, holding Emery's recent book

People with Disabilities Are Creative Problem-Solvers, Emery Says

BY ERIC BOCK

A disability is neither a weakness nor a barrier to leading a successful personal and professional life, said Crystal Emery at the National Disability Employment

SEE **EMERY**, PAGE 8

Mayo-Wilson Gives ODP Webinar, Nov. 27

The Office of Disease Prevention will hold a Methods: Mind the Gap webinar with Dr. Evan Mayo-Wilson about challenges associated with multiple outcome definitions in clinical research. It will take place on Tuesday, Nov. 27 at noon.

Dr. Evan Mayo-Wilson

Using examples from the Multiple Data Sources study, Mayo-Wilson will discuss the consequences of "multiplicity" for clinical investigators, systematic reviews and guideline developers and clinical decision-makers. He will highlight potential solutions to these challenges, including prospective registration and core outcome sets.

Mayo-Wilson is an assistant scientist in the department of epidemiology at Johns Hopkins Bloomberg School of Public Health. His research centers on evaluations of health and social interventions, particularly methods for conducting, reporting and synthesizing clinical trials.

Registration is required at https://prevention.nih.gov/education-training/methods-mind-gap/challenges-associated-multiple-outcome-definitions-clinical-research. The webinar will be recorded and available on the ODP website within about a week.

Community College Day Scheduled

The Office of Intramural Training & Education will host NIH Community College Day 2018 on Tuesday, Nov. 20 from 8 a.m. to 4 p.m. at Natcher Conference Center. This all-day event invites community college students and faculty to visit the Bethesda campus and learn about careers and training opportunities in biomedical and health care fields. To register and for more information visit www.training.nih.gov.

Summer Internship Program Makes Changes for 2019

The Office of Intramural Training & Education has made significant changes to the NIH Summer Internship Program for summer 2019. The most important changes affect program eligibility, the intern selection process and the nature of the program itself for high school students. Changes affecting older interns are minimal.

Beginning in 2019, summer interns must be age 17 by June 15 of the internship year. Individuals who are in high school must meet two additional criteria: they must be either juniors or seniors, and, if they will not be 18 by June 15 of the internship year, they must, at the time of application, reside within 40 miles of the NIH campus on which they hope to intern.

High school summer interns will be selected by an institute/center selection committee, rather than by individual principal investigators. Each IC will appoint a high school summer coordinator and devise a process for making intern selections. With limited exceptions, interns will not be appointed to ICs in which their parent/guardian works.

To ensure that all high school summer interns are ready to benefit from the internship experience, they will begin as a cohort on one of two start dates (June 13 or 24) and will attend a required orientation prior to joining their research groups. OITE has developed and piloted a full-day orientation for high school summer interns that was well received in 2018. In addition, OITE will provide a summer curriculum focused on the development of scientific and professional skills and on college readiness.

For more details, visit https://www.training.nih.gov/programs/hs-sip.

NIDA Researcher Brangwynne Named 2018 MacArthur Fellow

Dr. Clifford Brangwynne, a NIDA grantee, was recently awarded the John D. and Catherine T. MacArthur fellowship for his work in using the principles of soft matter physics and cell biology to illuminate novel mechanisms of cellular compartmentalization that drive biological development.

Dr. Clifford Brangwynne

Brangwynne studies liquid-liquid phase transitions in the nucleus and other biological processes. The MacArthur Fellowship is a $625,000 award given to talented, original and creative individuals as an investment in their potential. The award is based on exceptional creativity, track record of significant accomplishments that show promise for important future advances and potential for the fellowship to facilitate subsequent creative work.

Brangwynne is currently an associate professor in the department of chemical and biological engineering at Princeton University and an investigator at the Howard Hughes Medical Institute. He had been supported by the NIH Director's New Innovator Award as well as a Common Fund 4D Nucleome grant (U01) administered by NIDA.

Inaugural Shred Day participants include (from l) Cassandra Hairston of NIHFCU, NIH deputy director for management Dr. Alfred Johnson and Steve Levin of NIHFCU.

Inaugural 'Shred Day' Event Succeeds

On Oct. 11, NIH hosted the inaugural Community Shred event at Bldg. 1 to provide employees with an easy location and way to properly dispose of their personal documents. Despite an early morning downpour and the threat of more rain in the forecast, volunteers greeted everyone and helped offload their bags and boxes to be shredded.

Dr. Alfred Johnson, NIH deputy director for management, was the first to drop off his personal paper for shredding. Over the next 2 hours, more than 83 people arriving in cars, vans and on foot dropped off roughly 4,500 lbs.—or 2.25 tons—of paper for immediate shredding and recycling. The NIH Federal Credit Union provided participants with a green tote bag and a bottle of water.

The event was sponsored by NIHFCU in partnership with the Office of Research Services, Division of Amenities and Transportation Services. To find out about additional community events sponsored by ORS, visit https://www.ors.od.nih.gov/pes/dats/Pages/index.aspx.

Employees from DATS and NIHFCU assist with the collection.

NLM's Bijan Bagheri recently won two gold medals in tennis at the Special Olympics.

PHOTO: SPECIAL OLYMPICS

NLM Athlete Wins Olympic Gold Medals

The idea that one day he would stand on a podium with gold medals around his neck for tennis as the Olympics theme song played seemed as far away as Wimbledon for NLM's Bijan Bagheri.

After all, he wasn't a competitive athlete in high school. His mother was told that Bagheri would never even be able to ride a bike because of autism.

But Bagheri doesn't let autism get in the way of athleticism or work.

The 29-year-old office clerk earned two gold medals for tennis this year—one for singles and one for doubles.

As a Special Olympian, Bagheri is part of a 50-year-old organization founded by Eunice Kennedy Shriver that includes millions of athletes who participate in 50,000 competitions in more than 170 countries.

Because of his can-do spirit on and off the court, Bagheri was recently featured as a "Rising Star" by local WJLA TV (https://wjla.com/sports/rising-stars/montgomery-county-special-olympics-athlete-bringing-home-the-gold).

The work ethic it takes to compete as an athlete helps Bagheri at NLM, where he is known for arriving half an hour early every day to deliver packages, handle inventories and complete other tasks. If the office is closed for any reason, he is disappointed.

Bagheri says he is most proud of three things in life: his family, NLM and tennis.

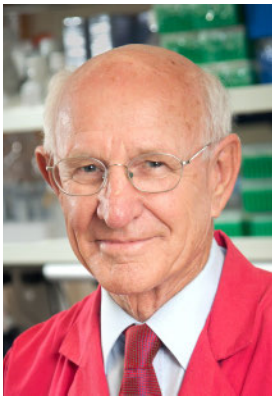
Like many Olympians all over the world, Bagheri's medals hang in his home where he can see them every day. Each Special Olympics medal is embossed with the organization's universal values: Skill, courage, sharing, joy.

Winning two gold medals made Bagheri feel so "happy and excited" that he'd definitely like another!—**Kathryn McKay**

Webster To Give Chanock Memorial Lecture, Nov. 20

On the centennial of history's deadliest pandemic, world-renowned virologist and influenza researcher Dr. Robert G. Webster will present the 2018 NIAID Robert M. Chanock Memorial Lecture. The talk, "Influenza pandemics of the past century: 1918-2009," will take place in Bldg. 50, 1st floor conference room, at 9 a.m. on Tuesday, Nov. 20. Webster is an emeritus member of the department of infectious diseases at St. Jude Children's Research Hospital, Memphis.

The "Spanish" flu, which swept the globe in 1918-1919, killed more people worldwide than died in all the battles of World War I. Exactly how and where the 1918 virus originated and how it became pandemic in humans is still debated, but genetic evidence strongly suggests that the virus originated in birds. Webster will discuss a major focus of his research career: the role played by wild aquatic birds as a reservoir of influenza viruses and source of new pandemic strains that can infect people and other animals. He also will describe modern avian influenza viruses with pandemic potential, including H5N1, which emerged in Hong Kong in 1997, and H7N9, which has caused more than 1,600 cases and 623 deaths since its 2013 emergence. Webster will outline ways to mitigate future influenza pandemics through such measures as closing live poultry markets; developing influenza-resistant swine and poultry; and developing a universal influenza vaccine to protect against seasonal as well as pandemic virus strains.



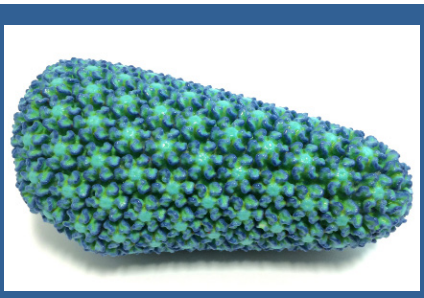
Over the course of five decades, Webster's research advanced the understanding of the evolution and control of novel influenza viruses. His other research interests include viral immunology, the structure and function of influenza virus proteins and the development of new vaccines and antivirals. His trainees span the globe, including those at NIAID, CDC and WHO. He also helped establish the NIAID-supported Center of Excellence for Influenza Research and Surveillance at St. Jude Children's Research Hospital.

The lecture honors the late virologist Dr. Robert M. Chanock, who worked at NIAID for more than 50 years, including more than three decades as chief of the Laboratory of Infectious Diseases. Among other accomplishments, Chanock was the first to identify respiratory syncytial virus (RSV) in humans; he collaborated in developing a monoclonal antibody to prevent RSV disease. He also helped lead the development of vaccines against adenovirus and rotavirus and the first influenza vaccine formulated as a nasal spray.

NICHD's Stratakis Honored

NICHD scientific director Dr. Constantine Stratakis accepted the International Award from the European Society for Paediatric Endocrinology at its 2018 annual meeting held recently in Athens, Greece. The award recognizes outstanding scientific contributions by a pediatric endocrinologist practicing outside Europe. Stratakis' laboratory has identified a number of genetic defects leading to endocrine and other tumors and has described several new diseases, including one that bears his name, Carney-Stratakis syndrome.

PHOTO: MARLEEN VAN DEN NESTE



ON THE COVER: *Capsid of HIV.*

IMAGE: JANET IWASA, NIH 3D PRINT EXCHANGE

The NIH Record

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Editor: Rich McManus
Rich.McManus@nih.gov

Associate Editor: Carla Garnett
Carla.Garnett@nih.gov

Staff Writers:
Eric Bock • *Eric.Bock@nih.gov*
Dana Talesnik • *Dana.Talesnik@nih.gov*

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NIH National Institutes of Health
Turning Discovery Into Health

Kay

CONTINUED FROM PAGE 1

modern computing. An original member of the Xerox-PARC group and a Turing Award winner, he addressed the topic, "Is it too late to invent a healthy future?"

Early in his presentation of the National Library of Medicine's annual Lindberg-King Lecture recently, Kay, who is now president of the Viewpoints Research Institute and adjunct professor of computer science at UCLA, called computing, his field of technology, "almost blind—it relies on little to no human context or history."

Not only is it blind to the world in which it is pursued, but also it may be an example of what Kay called "inverse vandalism—making things just because you can" borne of "a misplaced desire to make things.

"The future, to me, is not the next 5 years, or the next 10 years," he said. "I see it extending in front of us at least as far as our era...one hundred, or a few hundred years ahead is a useful way to think about it."

A child born today will be 82 in 2100. "Will the child get there at all? Could things be better then?"

Recent human history can make one a pessimist, he suggested. There have been 43 genocides in the 60 years spanning 1956-2016, according to the Political Instability Task Force, resulting in some 50 million deaths.

This does not even take into account the purges under Stalin and the Nazi Holocaust, which acutely affected a 7-year-old Kay as he saw, in the pages of *Life* magazine, Margaret Bourke-White's ghastly images of the concentration camp at Buchenwald.

"I had never seen anything like this," murmured Kay, still stunned. "That incident marked me for life."

His argument is that human societies that readily tolerate extreme—and even normalized—violence, such as ravaged Rwanda in recent decades, need to take a hard, fresh look at what constitutes mental health. "This is starting to look like normal behavior—like war—not off-to-the-side behavior...massacres and lynchings and murders are still happening."

When "normal" people are okay with genocide, maybe normal needs a reboot.

Kay likes a quote from Albert Einstein: We cannot solve our problems with the same kinds of thinking we used when we created them.

The good news, Kay said, is that places like NIH and the National Science Foundation are good at creating able emissaries to the future.

Musing on the topic of what children can learn, Kay quipped, "Adults think the best idea is to turn out people who are just like them. Which is a dumb idea, even if you're good.

"By far, the best way to predict the future," he said, returning to his topic "is to invent the children who will invent the healthy future."

Kay remains acutely skeptical of what constitutes normality. Given that about a quarter of a percent of the population—outliers, not the norm—usually consider themselves conscientious objectors, "that means that 99.7 percent think it's okay to kill. It's completely normal to be willing to kill others if your culture says it's okay."

Which is a scary concept given that recent studies of cognitive bias prove that "humans are basically delusional—we project our beliefs out into the world."

Kay paused to challenge, in a friendly way, NIMH director Dr. Josh Gordon, who was in the Lister Hill Auditorium audience: "NIMH is not involved with 'normal' human mental disorders of thinking and behavior that are so disastrous to civilization and life. It's not part of NIMH's charge."

Kay concluded with advice on "how not to get trapped by our bad brains." Oddly enough, it involved Ted Williams, arguably the greatest hitter baseball has ever seen.

To make himself a better hitter, Williams invented the batting tee, said Kay. It enabled him to perfect the difficult task of "hitting one round thing with another round thing."

What is the tee-ball of math and logic, and of science and computing for kids? Kay asked, proceeding to offer graphic examples using Tinker toys, Play-Doh and even the video capabilities of a smartphone. Given instruction, repetition, plenty of practice time and a good dollop of social sharing, humans—even with the burden of their past animal minds—can do some amazing and beneficial things, he said.

Ever the diagnostician of systems, Kay had a final challenge for NIH'ers: There is a shortfall of about 1 million elementary school teaching aides in science and math in the U.S., but around 2 million people age 65-70 with STEM backgrounds who could help. At NIH alone, he said, there are about 9,000 people who could be helping kids better cope with a looming future.

"You could make an enormous difference," said Kay, "if you got out there and helped the existing elementary school teachers."

The Lindberg-King Lecture honors former NLM director Dr. Donald Lindberg and former NLM deputy director for research and education Dr. Donald West King. Lindberg was on hand to present a crystal bowl to Kay in honor of the occasion.

"By far the best way to predict the future is to invent the children who will invent the healthy future," said Kay, who gave this year's Lindberg-King Lecture at NLM.

PHOTOS: MARLEEN VAN DEN NESTE

Gaudet To Give NCCIH Straus Lecture

"What really matters to you in your life? What brings you a sense of joy and happiness?"

These are questions that we don't typically hear in our current health care system, says Dr. Tracy Gaudet, who will deliver NCCIH's upcoming Stephen E. Straus Distinguished Lecture in the Science of Complementary Therapies. And they're at the center of a new initiative Gaudet has led since 2011 at the Department of Veterans Affairs (VA) to deliver personalized, proactive and patient-centered care to our veterans.

Dr. Tracy Gaudet

Gaudet, inaugural executive director of the VA's Office of Patient Centered Care and Cultural Transformation, will speak on "Transforming Veterans' Health: Implementing a Whole Health System of Care" on Thursday, Nov. 29 at 10 a.m. in Lipsett Amphitheater, Bldg. 10, and on videocast. NCCIH's annual lecture honors the center's founding director.

The "Whole Health System" was developed at the VA and initially deployed at 18 flagship facilities. It includes not only conventional treatment but also patient empowerment; a personalized plan for health and well-being; self-care; skill building; and complementary and integrative modalities.

A key concept is to empower and equip people to take charge of their health and well-being and to live their lives to the fullest, based on their own goals and priorities. The system also provides opportunities for health services research.

Gaudet, a board-certified obstetrician-gynecologist, is author of two books on women's health and has been featured in *The New Medicine* on PBS, as a "Game Changer" in *Fortune* and as one of the "Top 25 Women in Healthcare" in *Modern Healthcare*. Previously, she was director of Duke Integrative Medicine, in Durham, N.C.

Her lecture is supported by the Foundation for the National Institutes of Health with a gift from Bernard and Barbro Osher. More information is at https://nccih.nih.gov/news/events/lectures.

ISEF HONORS

NIDA Hosts Winners of Addiction Science Awards

The winners of NIDA's 2018 Addiction Science Awards, part of the Intel International Science and Engineering Fair (ISEF), presented their projects to NIDA director Dr. Nora Volkow and other NIDA scientists recently. Following the presentation, the awardees toured the NIH campus and NIDA's intramural program. The Addiction Science Awards are coordinated by NIDA as well as Friends of NIDA, a private group dedicated to furthering NIDA's mission. ISEF is the world's largest science competition for high school students.

First place went to Mia Yu and Daphne Liu from West High School in Salt Lake City for their project "Undetected Suicide: Classification of Undetermined Drug-Related Deaths Using Machine Learning Techniques." The two students compared three machine-learning models to determine how well they could identify undetermined overdose deaths as actual suicides. Using existing machine platforms, they first plugged in overdose deaths already classified as either suicide or accidental. From there, they identified the most accurate computational model. They then used that model to measure the overdose deaths listed as undetermined. Using data from the state of Utah, the machine-learning technique determined that drug-related suicide deaths were underreported by 34 percent.

Second place went to Anil Tolwani, Rohan Arora and Venkat Krishnan, three seniors from the American High School in Fremont, Calif., for "LabTrak: A Micro-Telemetry Device for Modeling Mice Behavior." The teens developed a well-tested and lightweight non-invasive tool to measure mouse movements during the preclinical phase of medication development. The tool is designed to send data straight to a computer or even a cell phone. Buprenorphine and ketamine were administered along with controls to enable the young scientists to measure the reactions of the mice to medications. They were able to develop a chip sensitive enough to determine the difference between specific types of mouse actions, including running, scratching, turning or head movements. The chip is even designed to "sleep" while the animal sleeps to preserve the battery.

Winning third place was Saadh Ahmed, a senior from Northview High School in Johns Creek, Ga., for his project "Development of a Drug-Likeness Rule for Natural Products." In the early stages of drug development, scientists seek out compounds that are similar to others that show promise. While standard rules exist for identifying similar synthetic compounds, "drug-likeness" rules for natural compounds have not proven to be as nuanced or accurate. The 17-year-old student began with an analysis of a database that contains drug-like natural compounds and evaluated them for patterns and commonalities. Using qualitative and quantitative screening techniques, he developed streamlined measures for identifying multiple natural compounds that could be worthy of study for specific health conditions.

On hand at the Addiction Science Awards are (from l) chief of NIDA's Public Information and Liaison Branch Carol Krause, third-place winner Saadh Ahmed, second-place winners Anil Tolwani, Rohan Arora and Venkat Krishnan, first-place winners Mia Yu and Daphne Liu, NIDA director Dr. Nora Volkow and Friends of NIDA chair Dr. William Dewey.

Regeneration

CONTINUED FROM PAGE 1

biological attributes and characteristics."

The biomedical research enterprise has chosen to direct most of its resources toward investigating the genetic underpinnings of a relatively small number of major life forms—vertebrates such as humans, chicks, frogs, mice and zebrafish and invertebrates such as *Drosophila* and *C. elegans*, Sánchez Alvarado said. The vast majority of the research organisms used in labs today are derived essentially from one particular phylum, he pointed out.

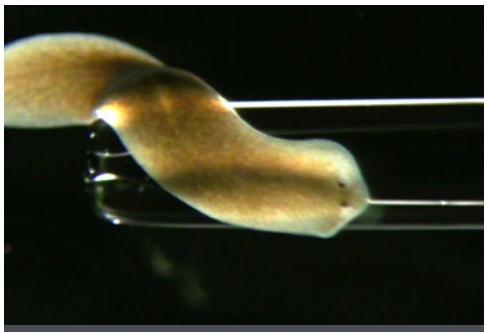
"When you think about what these organisms have taught us, it's immense," Sánchez Alvarado continued. "We have invested a huge amount of time and we have learned a great deal of information, but we have selected a very small number of animals to do so...What I want to illustrate is why this actually might begin to impinge upon our ability to interrogate nature by limiting our ability to go out and discover new biology."

Out of the roughly 9 to 10 million species recorded by the last animal inventory, the ones scientists have thoroughly investigated represent only about 0.00009 percent of organisms on the planet, Sánchez Alvarado said.

"So the question is, what are the odds that everything that we need to understand about biology would be encompassed by that 0.00009 percent? The answer is essentially zero," he said. "The amount of information that we are ignoring—or choosing to ignore for whatever reason—is immense and is by far much bigger than anything we have learned so far. It would behoove us to try to start looking at what it is we don't know."

Showing a list of life forms already identified on biology's "tree of life," Sánchez Alvarado noted the dozen or so categories of living things that scientists know hardly anything about, but that share common ancestry with us. "It's an entire branch of our family tree that we know next to nothing about," he lamented. "That needs to be corrected."

The argument he usually hears in response is one of practicality, that science already has high resolution of established so-called model systems, so why attempt low resolution of what could turn out to be non-model systems?



The planarian flatworm has a lot in common—biologically—with humans and other organisms. Sánchez Alvarado and his team aim to find out more about its regeneration capabilities.

PHOTOS: CHIA-CHI CHARLIE CHANG

"Think of it as mapping already-discovered continents versus discovering new continents," counters Sánchez Alvarado. Both pursuits are equally valuable, put in perspective.

This kind of rethinking led him and his research team to consider different ways to study remarkable processes in developmental biology such as regeneration. They began examining the *Schmidtea mediterranea*, or flatworm planaria.

• • •

"The amount of information that we are ignoring—or choosing to ignore for whatever reason—is immense and is by far much bigger than anything we have learned so far."

–DR. ALEJANDRO SÁNCHEZ ALVARADO

• • •

"These animals are very charismatic when you look at them under a microscope," said Sánchez Alvarado, showing video of the drab beige cockeyed organism—magnified several-fold—in motion.

Charisma notwithstanding, flatworms share several biological attributes with humans and other organisms: They are bilaterally symmetric. Their cells have all three germ layer derivatives—ectoderm, mesoderm and endoderm. They also possess complex organ systems—central nervous system, excretory system, intricate anatomical system. Their genome too is roughly the same size as the first four human chromosomes.

In addition planarians are, in nature, "exclusively sexually reproducing and exclusively asexually reproducing animals.

"The hope here," Sánchez Alvarado explained, "was that we could begin to compare sexual reproduction to regeneration and asexual reproduction to regenesis and try to identify what may be similar or dissimilar in these processes to shed some light on the process of regeneration."

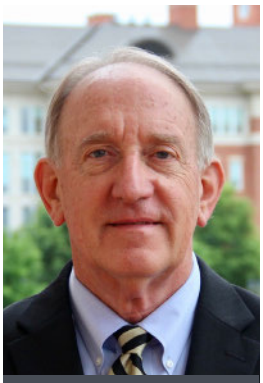
Turns out, "a lot of the plasticity is codified in the genome of this animal," Sánchez Alvarado said. His group has identified both the stem cells that have such remarkable flexibility—neoblasts and those that conduct the renewal process specifically—clonogenic neoblasts (cNeoblasts).

"Neoblasts are vastly more heterogeneous than anybody had ever anticipated," Sánchez Alvarado explained.

His team has also been able to purify live cNeoblasts, provide an initial line of evidence of the transcriptional plasticity properties of neoblasts, and, for the first time ever, culture planarians' cell division in a petri dish.

Concluding his talk, Sánchez Alvarado said his group's next tasks—isolation of adult pluripotent stem cells—will allow even more detailed characterization of cNeoblasts' genomic output. In addition, performing systematic cell cultures will offer further opportunity to manipulate the cells' properties and behavior and perhaps usher in use of new technologies such as CRISPR cas9 "that we really need to continue to interrogate this biology."

May To Give NIAAA's Keller Lecture, Nov. 29


Dr. Philip A. May

Dr. Philip A. May will deliver the 2018 Mark Keller Honorary Lecture on Thursday, Nov. 29 at 1:30 p.m. in Masur Auditorium, Bldg. 10. The title of his talk is "Prevalence of Fetal Alcohol Spectrum Disorders: Characteristics and Correlates."

May is an internationally recognized expert in fetal alcohol syndrome (FAS) and fetal alcohol spectrum disorders (FASD), with a distinguished research career spanning nearly 50 years. By studying the adverse effects of prenatal exposure to alcohol, his work has advanced our understanding of the prevalence, characteristics, etiology, diagnosis and prevention of FAS and FASD.

May is currently professor in the department of nutrition of the Gillings School of Global Public Health and the Nutrition Research Institute at the University of North Carolina at Chapel Hill, professor emeritus at the University of New Mexico (UNM) and adjunct professor of pediatrics at the Sanford School of Medicine, University of South Dakota. In addition to holding these academic positions, May is an extraordinary professor of obstetrics and gynecology at Stellenbosch University, South Africa. He also served for 9 years as the first director of the Center on Alcoholism, Substance Abuse and Addictions at UNM.

During his distinguished career, May has been the principal investigator of more than a dozen major population-based FAS/FASD epidemiologic studies of children. In addition to being applied to several Native American communities in the U.S. Southwestern and Northern Plains and other communities in the United States, South Africa and Italy, the active case ascertainment methodology he developed has been applied to research with communities in Canada and Poland. It is also being used in several ongoing studies in Eastern Europe and Sub-Saharan Africa through a collaboration between NIAAA and the World Health Organization.

May's work has been crucial in understanding the factors that contribute to risk for FASD and related outcomes. Additionally, he has helped identify and evaluate educational, cognitive and nutritional interventions to mitigate the developmental consequences of FASD in affected children and to aid in managing their daily lives.

May is co-leader of the Collaboration on Fetal Alcohol Spectrum Disorders Prevalence (CoFASP) research consortium, which studies the prevalence of FASD among school-age children in the United States. Earlier this year, CoFASP published the results of a pivotal study that used school-based assessments, a common methodology and classification system, and expert in-person evaluations for the full range of FASD among many children from communities across the United States. The study provides findings that more accurately reflect the true prevalence of FASD within the country and underscores the need for more focus on screening, diagnosis, prevention and treatment of FASD.

NIAAA established the Mark Keller Honorary Lecture Series as a tribute to Keller's pioneering contributions to the field of alcohol research. Honorees have made significant contributions to our understanding of how alcohol affects the body and mind, how we can prevent, diagnose and treat alcohol misuse and alcohol use disorder and how today's scientific advances can provide hope for tomorrow. R

Sharpless To Deliver 2018 Mahoney Lecture on Aging

NOV. 28

Dr. Ned Sharpless, director of the National Cancer Institute, will deliver a lecture, "Senescence: Live fast, die young and leave a good-looking corpse," on Nov. 28 at 3 p.m. in Masur Auditorium, Bldg. 10. His presentation is the annual Florence Mahoney Lecture on Aging, sponsored by NIA and part of the NIH Director's Wednesday Afternoon Lecture Series.


Dr. Ned Sharpless

In addition to serving as director of NCI, Sharpless continues his research as chief of the aging biology and cancer section of NIA's Laboratory of Genetics and Genomics. The lab studies the biology of the aging process that promotes the conversion of normal self-renewing cells into dysfunctional cancer cells. The lab also studies pharmacological approaches to protecting stem cells *in vivo* and is working to characterize circular RNAs, a novel form of non-coding RNA. Sharpless has made seminal contributions to the understanding of the relationship between aging and cancer and in the preclinical development of novel therapeutics for melanoma, lung cancer and breast cancer.

Sharpless was named NCI director in 2017. Prior to his appointment, he served as director of the Lineberger Comprehensive Cancer Center at the University of North Carolina, Chapel Hill, a position he held since January 2014. He has authored more than 150 original scientific papers, reviews and book chapters and is an inventor on 10 patents. He cofounded two clinical-stage biotechnology companies: G1 Therapeutics and HealthSpan Diagnostics.

Sharpless earned his undergraduate degree and his medical degree at UNC. He completed his internal medicine residency at Massachusetts General Hospital and a hematology/oncology fellowship at Dana-Farber/Partners Cancer Care in Boston, part of Harvard Medical School.

He is a fellow with the American Association of Cancer Research, an elected member of the American Society of Clinical Investigation and the Association of American Physicians and an immediate past member of NIA's National Advisory Council on Aging.

The annual Mahoney Lecture is named in honor of Florence Stephenson Mahoney (1899-2002). She devoted the last half of her life to successfully advocating for the creation of NIA and increased support for NIH.

There will be a reception and an opportunity to talk with Sharpless in the NIH Library following the lecture.

VOLUNTEERS

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.

Emery

CONTINUED FROM PAGE 1

Awareness Month kickoff in Lipsett Amphitheater on Oct. 11.

"The real barrier is perception and unconscious bias," said Emery, author, educator, filmmaker and founder and CEO of URU The Right To Be, a non-profit content production company, which creatively intersects humanities, the arts, science and technology to bring awareness to societal gaps involving equity, diversity and inclusion.

Without thinking about it, she said, most people perceive a disability as a weakness or a flaw that interferes with a "person's capacity to survive, contribute, succeed and triumph." That's not the case, however.

Employees with disabilities have a perspective that's unique in the workplace, Emery said. They are problem-solvers and "some of the most brilliant people in your work environment." Additionally, she said, they are mentally and spiritually strong.

People with disabilities "deserve equal opportunity to earn income and achieve independence just like everybody else." Bringing them into the workplace requires that leaders advocate for diversity and inclusion. She defined inclusivity as recognizing that "someone has an intrinsic value, worth and talent without mentally adding qualifiers."

Emery likened hiring people with disabilities to creating a new chemical compound. Just as adding a new substance changes a compound's chemistry, hiring a person with a disability changes the workplace chemistry to become more diverse, inclusive and compassionate.

"If you don't introduce a new substance to the mix, the compounds remains inert," she said.

Leaders must identify barriers in the workplace that prevent people with disabilities from advancing in the organization. For example, federal employees voluntarily self-identify their disability. Emery said some people may choose not to do this out of fear that their disclosure would be used against them.

Employees with disabilities need more than their talents and creativity to overcome stereotypes and unconscious bias.

"Changing perceptions means we have to get the people who wield the power to stand with us, to demonstrate that it's okay to bring us in to the fold," Emery said. "We have to make it crystal-clear that we need them to do that."

As a member of the disabled community herself, she cautioned against calling a person with a disability inspirational.

"They're not looking for your pity," she explained. They just want to do their job, be recognized for their work and be treated just like everyone else.

"I find it insulting when someone acknowledges me for my achievements and then minimizes it by saying 'Oh, it's amazing what you're able to do despite your disability,'" Emery said.

She encouraged staff to be more humane and compassionate.

"You have to develop a sensitivity for your coworkers and create a safe place where those around you can experience—perhaps for the first time—what it's like to be taken seriously and not treated with condescension," she concluded. "As more of you join together and talk about this issue openly, change will begin to happen."

Emery and her staff (from l) Justice Burch, Brooke Burling, Thelma Miller, Sidney Cummings Jr., Robert Emery-Thomas, Connie Royster and Uriah Monk

PHOTOS: MARLEEN VAN DEN NESTE

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"You have to develop a sensitivity for your coworkers and create a safe place where those around you can experience—perhaps for the first time—what it's like to be taken seriously and not treated with condescension."

-CRYSTAL EMERY

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A new study suggests that gut bacteria may control movement in fruit flies.

IMAGE: USDA

Gut Bacteria May Control Movement

A new study puts a fresh spin on what it means to "go with your gut." The findings, published in *Nature*, suggest that gut bacteria may control movement in fruit flies and identify the neurons involved in this response. NINDS supported the research.

"This study provides additional evidence for a connection between the gut and the brain, and in particular outlines how gut bacteria may influence behavior, including movement," said Dr. Margaret Sutherland, NINDS program director.

Researchers led by Dr. Sarkis Mazmanian, professor of microbiology at the California Institute of Technology, and graduate student Catherine Schretter, observed that germ-free flies, which did not carry bacteria, were hyperactive. For instance, they walked faster, over greater distances, and took shorter rests than flies that had normal levels of microbes. Mazmanian and his team investigated ways in which gut bacteria may affect behavior in fruit flies.

"Locomotion is important for a number of activities such as mating and searching for food. It turns out that gut bacteria may be critical for fundamental behaviors in animals," said Mazmanian.

Fruit flies carry between 5 and 20 different species of bacteria and Mazmanian's team treated the germ-free animals with individual strains of those microbes. When the flies received *Lactobacillus brevis*, their movements slowed down to normal speed. *L. brevis* was one of only two species of bacteria that restored normal behavior in the germ-free flies.

Mazmanian's group also discovered that the molecule xylose isomerase, a protein that breaks down sugar and is found in *L. brevis*, may be critical to this process. Isolating the molecule and treating germ-free flies with it was sufficient to slow down the speedwalkers.

Researchers Identify Immune Culprits Linked to Bone Loss in Gum Disease

An unhealthy population of microbes in the mouth triggers specialized immune cells that inflame and destroy tissues, leading to the type of bone loss associated with a severe form of gum disease, according to a new study in mice and humans. The research, led by scientists from NIDCR and the University of Pennsylvania School of Dental Medicine, could have implications for new treatment approaches for the condition. The findings appeared online Oct. 17 in *Science Translational Medicine*.

Periodontal disease is a common disorder that affects nearly half of American adults over age 30, and 70 percent of adults 65 and older. In those affected, bacteria trigger inflammation of the tissues that surround the teeth, which can lead to loss of bone and teeth in an advanced stage of the disease called periodontitis.

"We've known for years that microbes stimulate inflammation," said study senior author Dr. Niki Moutsopoulos, a clinical investigator at NIDCR. "Removing bacteria by tooth-brushing and dental care controls inflammation, but not permanently, suggesting there are other factors at play. Our results suggest that immune cells known as T helper 17 cells are drivers of this process, providing the link between oral bacteria and inflammation."

Moutsopoulos and colleagues observed that T helper (Th) 17 cells were much more prevalent in the gum tissue of humans with periodontitis than in the gums of their healthy counterparts, and that the amount of Th17 cells correlated with disease severity.

Th17 cells normally live in so-called barrier sites—such as the mouth, skin and digestive tract—where germs make first contact with the body. Th17 cells are known to protect against oral thrush, a fungal infection of the mouth, but they are also linked to inflammatory diseases such as psoriasis and colitis, suggesting that they play dual roles in health and disease.

Unhealthy microbes in the mouth trigger immune cells that inflame and destroy tissues, leading to bone loss associated with gum disease, according to a new study.

IMAGE: GETTY

The vitamin-like substance myo-inositol does not appear to prevent a potentially blinding complication of preterm birth.

PHOTO: MAJESTICCA/ISTOCK

Myo-Inositol Unlikely to Reduce Risk of Eye Condition in Preterm Infants

Contrary to results from earlier studies, the vitamin-like substance myo-inositol does not appear to prevent a potentially blinding complication of preterm birth and may even reduce rates of survival among preterm infants, suggests a study funded by NIH. The study, conducted by researchers in the Neonatal Research Network funded by NICHD, NEI and NCATS, appears in the *Journal of the American Medical Association*.

The blinding complication, called retinopathy of prematurity (ROP), largely affects infants born before 32 weeks of pregnancy. It results from an abnormal growth of blood vessels in the retina, the layer of tissue at the back of the eye that is sensitive to light. The researchers treated preterm infants born before the 28th week of pregnancy with myo-inositol, after previous studies of slightly older preterm infants suggested that the substance could reduce the chances of ROP.

After enrolling 638 of a planned 1,760 participants, the researchers suspended the study when they discovered tiny glass particles in less than 2 percent of the vials in 1 of 2 batches of myo-inositol. The particles resulted from delamination—the shedding of tiny glass flakes from the inside of the vials. These particles potentially could cause swelling or immune reactions at the injection site, although according to the Food and Drug Administration, there is no evidence that the particles have caused harm to date.

In the current study, researchers found no differences in outcomes between infants given myo-inositol from batch 1 or batch 2. An analysis of the study showed that 29 percent of infants receiving myo-inositol had either died or developed early-stage ROP, compared to 21 percent in the placebo group, which prompted the researchers to end the study.

Tromberg Named Next NIBIB Director

Dr. Bruce Tromberg will be the new director of the National Institute of Biomedical Imaging and Bioengineering, starting in 2019.

PHOTO: PAUL KENNEDY, UCI

Dr. Bruce Tromberg has been named new director of the National Institute of Biomedical Imaging and Bioengineering. He is expected to join NIH in the new year.

A pioneering leader in the field of biophotonics, he is currently a professor at the University of California at Irvine, with dual appointments in the departments of biomedical engineering and surgery. He is also director of UCI's Beckman Laser Institute and Medical Clinic, an interdisciplinary research, teaching and clinical center for optics and photonics in biology and medicine.

In his 30-plus-year academic and scientific career, Tromberg has conducted extensive NIH-supported research and has been the principal investigator for multiple NIH grants going back as far as 1994. This includes 20 years as PI for the Laser Microbeam and Medical Program, an NIH National Biomedical Technology Resource Center where several cutting-edge technologies have been developed and disseminated to laboratories and clinics around the world.

In addition to advisory committee appointments with numerous national and international entities, Tromberg has provided expertise on NIH working groups, review committees and boards, including the NIBIB National Advisory Council from 2012 to 2016.

Tromberg's research spans biophotonics and biomedical optics, two rapidly growing fields that use light to image and conduct therapy at the molecular, cellular and tissue levels. He has co-authored more than 450 publications and holds 18 patents for biophotonics technologies and their applications in areas such as cancer, neuroscience and vascular disease. He specializes in new technology development as well as the "bench to bedside" clinical translation, validation and commercialization of promising methods designed to improve human health.

As a high school student, Tromberg volunteered in a National Cancer Institute laboratory, graduating in 1974 from Woodrow Wilson High School in Washington, D.C. He earned a B.A. in chemistry and psychology in 1979 from Vanderbilt University and a Ph.D. in chemistry in 1988 from the University of Tennessee.

While completing his Ph.D., he conducted research as a Department of Energy predoctoral fellow at the Oak Ridge National Laboratory.

Dr. Jill Heemskerk has been serving as NIBIB acting director since November 2017, and will return to her role as NIBIB deputy director.

Guadagno Retires from CSR

BY PAULA T. WHITACRE

Summer 1996 was a watershed season for Dr. Mary Ann Guadagno, who retired recently as a senior scientific review officer (SRO) in the Center for Scientific Review. She had become an SRO in the National Institute on Aging and had launched a new phase of her career. And she met Dr. Michael Micklin, also a new NIH hire at the time.

A mutual colleague invited Guadagno and Micklin to lunch in their first days on the job. "Then at every meeting I would go to at NIH, he would be there," she recalled. "The universe was pushing us together." They often talked about shared professional and music interests. In 1998, Guadagno had cancer and asked Micklin for rides after several treatments. In 2006, they married.

Micklin passed away on Feb. 22. Although he had Parkinson's disease, his death was unexpected and still difficult for Guadagno and his many friends, family members and colleagues to cope with. "The outpouring of support was tremendous," Guadagno said. "He was a real hero to so many people."

Guadagno attended the State University of New York at Buffalo, then Ohio State University, where she earned her master's and Ph.D. in applied economics. She wrote her dissertation on the gap in life insurance planning for divorced women with children. "It was a dismal situation for a lot of women, with the courts not taking life insurance assets into account," she said. Her research contributed to greater attention to the issue, including federal legislation.

Guadagno joined the University of Minnesota faculty and planned on a career in academia. During a faculty internship at Nationwide Insurance, however, she became involved in several cutting-edge projects and remained in its Life Insurance Co. for 6 years.

From 1989 to 1996, Guadagno worked for the U.S. Department of Agriculture and National Center for Health Statistics (NCHS). She moved to NIH when an NCHS colleague became a program officer and suggested she apply as an SRO.

Guadagno mostly worked in CSR after 2001, but also welcomed the challenge of different assignments. In 2006, she was NIH loaned executive to the Combined Federal Campaign. She also directed the NIH Guide for Grants and Contracts in the Office of Extramural Review. At CSR, she developed ways to assess stakeholder satisfaction and CSR performance metrics through surveys, focus groups and interviews.

Dr. Mary Ann Guadagno, shown with husband Dr. Michael Micklin, recently retired from CSR.

"Mary Ann brought special expertise to CSR in behavioral and social fields," said Dr. Richard Nakamura, director of CSR until April 2018. "She was very helpful to make sure we have a sound process and helped develop a real feedback loop."

This past year, with Micklin's passing and her own retirement, a watershed of another kind occurred in Guadagno's life. In September, she fulfilled Micklin's wishes to scatter his ashes in Puget Sound at a spot he cherished.

"This was not what I expected at the beginning of 2018," she acknowledged. She plans to find new ways to apply her research and evaluation skills to contribute to peer review, stakeholder satisfaction, organizational performance metrics and executive decision support systems. She also is seeking ways to support others who are caregivers to Parkinson's patients.

After 40 Years at NIH, Kosh Says So Long

BY CARLA GARNETT

In the late 1970s, Carol Kosh was heading for her last year of high school when recruiters from the federal Stay-in-School Program visited Montgomery Blair High School, offering qualified students the opportunity to make some money while continuing their education.

Having a part-time clerical job sounded good to Kosh, so she applied and promptly aced the required typing test, clocking 80 words per minute. Duly qualified, she began her career at NIH on May 24, 1978, as a GS-1 office automation clerk in NHLBI's intramural research program.

Carol Kosh

More than 40 years later at the end of September, Kosh retired as a branch chief in the NIH Office of Extramural Research's Division of Administrative Services. She reflected on a fortunate chance encounter that led to a professional life immersed in admin.

Day one on the job didn't start the way she expected. After reporting to personnel for orientation in Bldg. 31—stellar typing results in hand—Kosh was directed to the Clinical Center, where the supervisor began describing...the late shift. Bewildered, the teenager wondered aloud what she would be typing at night.

"Typing? This is housekeeping," the supervisor said, before noticing Kosh's skill certification and realizing she'd been misdirected. "You go right back over there," the woman told her firmly, "and tell them you're supposed to work in an office."

More nervous than ever, Kosh headed back to confront personnel. Eventually the confusion was cleared up and she was reassigned to a "floater" post, tackling admin jobs wherever NHLBI needed her in Bldg. 10.

Once she graduated from Blair in 1979, she became an NIH'er full time. Kosh earned steady promotions and increased responsibilities, working for Dr. Howard Kruth in the Laboratory of Experimental Atherosclerosis for the next decade and a half.

He recalled their humorous first encounter. "Not realizing that she was my new administrative assistant, I asked petite Carol in the hall outside my office, 'Little girl, are you lost?'" Kruth said. "Actually, I was lost with all the administrative tasks that she cheerfully undertook for some 15 years. I enjoyed working with Carol and appreciated her even demeanor and dedication to our research program."

The initial insistent nudge by that housekeeping supervisor resonated with Kosh for the rest of her career.

"During that time I didn't see many people who looked like me in the offices," she recalled, "so I realized that I was given a great opportunity and that I had to work hard in order to succeed."

In the course of four decades, she married, had children and in recent years welcomed grands. NIH culture and her coworkers made the workplace feel like a second home.

"They had the best baby showers for me," Kosh remembered. "Everybody appreciated each other and we were one big family."

Some of her most memorable moments "were forging friendships with the patients and their families as they came for their visits," she said. "Also knowing and respecting all of the many facets of NIH and how they all fit into the puzzle that supports the mission. I love our mission! I love what we do."

After 27 years in NHLBI, she transferred to OER in the Office of the Director in 2005. She also moved off campus to Rockledge for the first time.

"This was a big transition for me because I went from intramural research to extramural research," Kosh said. "I feel like I grew up at NIH and I can truly say that it takes a village to raise a child. In every phase of my career, so many people took a chance on me and I will forever be grateful for those opportunities.

"Once I became a branch chief AO," she continued, "I realized that I stood on the shoulders of many people who believed in me and it was now my duty to make sure that I paid it forward and provided my expertise to help others succeed."

Kosh has ushered several young people through the AO ropes. Several of her mentorees, she noted proudly, have surpassed even her own success, assuming posts beyond her level.

"I still remember all of the pushes that benefited me back in the day," she said.

Another rewarding experience for Kosh was serving as keyworker for the Combined Federal Campaign for more than 30 years.

"NIH'ers are some of the most generous people," she said. "We raise approximately $2.5 million per year to support various charities that are close to our hearts."

Although she'll miss the camaraderie and overall familial NIH atmosphere, Kosh said she wants to leave work while she's still got sufficient health and energy to devote to personal goals.

"My plans after I retire are to spend more time with my family, travel and continue to serve others at my church," she concluded. "There are so many projects I've been putting off—I'm in a knitting group that makes blankets for nursing home residents—and the grandkids are involved in so many activities I want to attend. It's been a great 40 years, but now it's time to say 'so long and thanks for the memories.'"

Kondratyev Heads CSR Review Group

Dr. Alexei Kondratyev has been named new new chief of the Center for Scientific Review's integrative, functional and cognitive neuroscience integrated review group. He has served as scientific review officer for CSR's chronic dysfunction and integrative neurodegeneration study section.

Dr. Alexei Kondratyev

Kondratyev will oversee 10 study sections that review NIH grant applications that cover a broad range of neuroscience research to advance knowledge of how the nervous system is organized and functions at an integrative, systems level.

He received his Ph.D. in chemistry from the Institute of Molecular Biology in Moscow and did postdoctoral training first at the National Institute of Child Health and Human Development and then in the department of radiation medicine, Georgetown University Medical Center.

Kondratyev later joined the faculty of Georgetown University, where he served as associate professor of pediatrics and pharmacology and headed the Laboratory of Pediatric Epilepsy Research.

His research focused on the molecular mechanisms of neurodegeneration and neuroprotection, neuronal DNA damage and repair, neurotrophic factors, animal models of acute neuronal injury and the developmental effects of antiepileptic drugs.

NEI director Dr. Paul Sieving, wearing an extra set of eyes atop his "Vision Team Coach" cap, kicks off the event.

Dylan Hirsch (l), an NIAID post-baccalaureate fellow, and Ani Ufot, an NCI postbac, tied for first place in the 5K run.

PHOTO: DUSTIN HAYS

"Dr. Sieving's Minion" and a bovine attendee amuse others under the tent.

PHOTOS: CHIA-CHI CHARLIE CHANG (EXCEPT WHERE NOTED)

NEI 5K a Success

The National Eye Institute hosted a 5K run/walk on Oct. 24 as part of a year-long celebration of its 50th anniversary. An estimated 300 NIH'ers and guests braved the chilly weather to pound the 3.25-mile course around the perimeter of the NIH campus.

Beyond the 5K itself, the day featured exhibits, food and fun. Visitors outside Bldg. 1 had a chance to try out NEI's new virtual reality experience, an educational tool that simulates what the world looks like to people with age-related macular degeneration or cataracts. There were also free vision screenings offered by the Prevention of Blindness Society of Metropolitan Washington.

Also on hand were representatives from the NIH Blood Bank and members of the physical therapy team from the Clinical Center's department of rehabilitation medicine. Lunch was available via food trucks.

Lilly Sadler, NEI management analyst, and Amishi Shah, NEI senior health communications specialist, coordinated the event with help from Chris Gaines, ORS Division of Amenities and Transportation Services.

At left, race warm-up routines get underway.

NEI deputy director Dr. Santa Tumminia exhorts crowd as NEI communicator Dustin Hays looks on.

The Eyes Have It? Above, NEI staff are all smiles as they cheer on the 5K participants. At right, ladies in pink set up a selfie.