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Trans-NIH Recruits

Meet the New Stadtmans

BY LAURA STEPHENSON CARTER

In 2009, the NIH launched the **Earl Stadtman** Tenure-Track Investigator Program, which recruits a more diverse group of scientists pursuing interests across the biomedical-research spectrum. The program is named for the legendary biochemist who worked at NIH for 50 years—In this issue of the *NIH Catalyst*, you'll meet the six Stadtman Investigators—all women—from the 2013–2014 recruitment cycle.

These talented scientists made significant discoveries before ever becoming Stadtman investigators. Three of the Stadtmans are cancer researchers. **Shahinaz Gadalla** (NCI-DCEG) published the first epidemiological evidence that patients with myotonic dystrophy are at high risk of certain cancers. **Romina Goldszmid** (NCI-CCR) showed for the first time that the gut microbiota control the response to cancer immunotherapy and chemotherapy. And **Britton Trabert** (NCI-DCEG) determined that aspirin may reduce the risk of ovarian cancer and that postmenopausal circulating estrogens are associated with rare subtypes of ovarian cancer.

The other three Stadtmans made important discoveries, too. **Astrid Haase** (NIDDK) defined the role of a binding protein in microRNA silencing and later identified the novel nuclease activity of a protein. **Katrin Mayer-Barber** (NIAID)

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Singing the Same Tune

A Conversation with World-Renowned Cellist Yo-Yo Ma

BY EMILY PETRUS, NINDS

ERNIE BRANSON

NIH Director Francis Collins and world-renowned cellist Yo-Yo Ma performed a duet on the Masur Auditorium stage after the two discussed the connection between music and science at the Rall Cultural Lecture in December.

"How can I keep from singing?" intoned NIH Director **Francis Collins** as he played his guitar to the tune of the 1800s hymn, "Always Rejoicing." The lyrics had a new meaning; who wouldn't want to sing when you're accompanied by a world-renowned cellist like Yo-Yo Ma.

Ma was the featured guest at the J. Edward Rall Cultural Lecture held in December, billed as a conversation between the cellist and the NIH Director. Yet Ma punctuated the conversation, to the audience's delight, with melodies played on "Sweetie Pie," his nickname for his 1712 Stradivarius cello.

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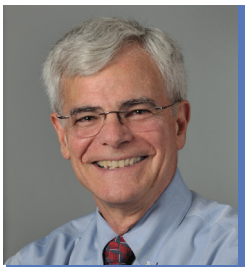


Let the Cores Roar: CREx Will Enable Access to Core Services across the IRP

BY MICHAEL GOTTESMAN, DDIR, AND ANDY BAXEVANIS, ASSISTANT DIRECTOR FOR COMPUTATIONAL BIOLOGY, OIR

Scientific resources abound in the Intramural Research Program (IRP) from cores creating antibodies to those growing zebrafish. There are so many resources, in fact, that it can be difficult to know what they are and how you can use them. One of the action items arising from the IRP's long-term plan is finding ways to make most core resources, equipment, and facilities more accessible to all scientists throughout the NIH.

We have made a big step in this direction with the adoption of the National Cancer Institute's (NCI's) "CREx"—originally the CCR Research Exchange but now available NIH-wide as the Collaborative Research Exchange. CREx (colloquially pronounced "C-Rex," and it is a big deal) is an online research marketplace to identify the capabilities of thousands of external vendors as well as more than 100 NIH cores.

The IRP has many state-of-the-art core facilities with excess capacity that could be shared among investigators. About a dozen of these facilities operate at an NIH-wide level and include such diverse offerings as the Imaging Probe Development Center, the NIH Intramural Sequencing Center, and high-throughput RNAi screening services. Dozens of others are housed within Institutes and Centers (ICs), including the NCI's nanotechnology core, the National Institute of Child Health and Human Development's zebrafish core, and the National Eye Institute's genetic-engineering core. Access to these facilities and many others could help our researchers pursue scientific investigations that they might never have dreamed of undertaking on their own. Check out the fast-paced IRP video that features some of these gems on the IRP web site, at https://irp.nih.gov/our-research/research-resources.

The trouble is that there has been no central catalog characterizing all of these core services. Researchers have been hard pressed to find them…until now! NCI has been using the CREx system successfully since 2013; about 400 NCI scientists—including principal investigators, postdocs, and staff scientists—have road-tested it. More importantly, NCI has realized substantial cost savings by using CREx to compare the cost and quality of NIH-based services to outside vendor-based services. CREx's robust reporting feature facilitates the making of strategic decisions such as whether to sunset core services that are available externally at a lower cost or to redirect funds to new technologies (and new core laboratories).

CREx is an easy-to-use, one-stop shop for research services and core facilities. You can use the Google-like search field to quickly find the desired services, technologies, products, or supplies, and filter the results to identify cores, other resources, and qualified vendors. The platform also enables users to look at multiple cores and vendors simultaneously, assess capabilities and gather quotes, and exchange files and project reports. Investigators can also rate and review vendors and services and share their experiences with the rest of the NIH.

NCI generously offered to open CREx to the entire IRP. In January 2016, the scientific directors concurred and approved a financial plan to support the expansion. The Office of Intramural Research's (OIR's) Director's Challenge Fund is funding the initial phase through fiscal year 2017. Then the ICs and OIR have committed to keeping CREx going for the foreseeable future.

CREx includes a dozen NIH-wide cores, 110 cores in 10 ICs including NCI, and more than 10,000 commercial vendors. And as time goes on, CREx will be adding more cores to its catalog of services.

In the months to come, we plan to have detailed instructions about how all labs can take advantage of CREx, including how any additional cost of supporting some activities in core facilities will be reimbursed. NCI scientists have lauded the system, describing it as a perfect mix of Google, eBay, Amazon.com, and Yelp in getting quality services quickly and at a good price. You can get a sense of how CREx works by pointing your web browser to https://nih.scientist.com. (You just need your NIH user name and password to access it, and then you can sign up for an account if you wish).

We hope that IRP researchers will use CREx to become aware of shared scientific resources throughout NIH including those embedded within the ICs. We anticipate that CREx will help foster collaborations, too. The more of us who use it, the better the system will be. Stay tuned.

For more information on CREX, visit its website at https://nih.scientist.com or contact Lakshmi Darbha (lakshmi.darbha@nih.gov or 301-496-2593).

New Resources for NIHers

Introducing the NIH Library Digital Production Studio

BY KATHLEEN MCGLAUGHLIN, NIH LIBRARY

K.MCGLAUGLIN, NIH LIB

Recording a podcast in the NIH Library's Digital Production Studio. NIH Library Informationist **Doug Joubert** (right) interviews bioinformatics specialist **Medha Bhagwat** (left), as reference assistant **Derek McDowell** monitors the recording.

Do you need to record an interview or podcast, practice a presentation, create an online tutorial, or host a webinar? The NIH Library (Building 10) invites you to consider using its new Digital Production Studio (DPS).

DPS is a self-service facility where you can create and produce audio and video projects. The studio is equipped with a digital audio recorder, a video camera, headphones, microphones, a lighting kit, soundproofing, a green screen, and more. In addition, editing software is available in the Technology Hub just outside the studio so you can edit and enhance your production.

The DPS is available at no charge to all NIH staff who have a valid ID card. You just need to make a reservation to use the studio, equipment, and the Technology Hub editing suite. Library staff will instruct you on how to use the equipment and provide other assistance if requested. Group and individual training sessions and tours are also available.

You need to bring your laptop, iPhone, iPad, or Android device to save your finished product. You can edit your product using the Technology Hub computers and editing software—Adobe Creative Cloud suite (Premier Pro, After Effects, Adobe Audition, Photoshop, InDesign, and more) as well as Camtasia and Captivate.

The DPS is part of the library's Technology Hub, a physical and virtual space where you can explore new technologies and discover how they can enhance their research. The Technology Hub also features three three-dimensional printers that NIH staff can use for free; collaboration pods equipped with basic and specialty software, a PC, plasma screen, headphone sockets, and a whiteboard; high-performance bioinformatics and data-service computing workstations; and a data-visualization touch screen.

Come explore the Digital Production Studio and Technology Hub at the NIH Library today. ●

For more information on the DPS and to make a reservation, go to https://nihlibrary.libcal.com/booking/studio. For more on the Technology Hub, go to https://nihlibrary.campusguides.com/techhub. For other questions or to book a training session or tour, send an e-mail to NIHLTechHub@nih.gov; call 301-496-1080; or visit the NIH Library Information Desk.

Microbiome Data Analysis with NIAID's Nephele

BY NICK WEBER, NIAID

Generating microbiome data is challenging, and analyzing it can be even harder. But the National Institute of Allergy and Infectious Diseases (NIAID) has developed a resource, called Nephele, that may help. You can upload data quickly and easily; choose from a variety of standardized analysis pipelines assembled using tools that include QIIME, mother , and bioBakery; and then download visualizations and easy-to-interpret results. Once you perform standardized microbiome analyses on your data, you can compare it to the Human Microbiome Project's Healthy Human Subjects data, too.

The NIAID Office of Cyber Infrastructure and Computational Biology has sponsored the public use of Nephele, which runs on the Amazon cloud. NIAID hopes that Nephele will help to address the challenges surrounding biomedical big data and make digital research objects more accessible through the use of cloud computing.

Once processing is complete, results can be interpreted with help from Nephele's tutorial videos or Nephele's Pipeline Output Guide. Typical outputs include BIOM files, heat maps, bar plots, taxonomy tables, and other reports and visualizations.

Nephele is targeted to intramural and extramural researchers, sequencing facilities, students, and citizen–scientists. To register for free access to Nephele and start analyzing data right away, go to https://nephele.niaid.nih.gov/#request. ●

For more information on Nephele, go to https://globalbiodefense.com/2016/11/07/nephele-niaids-newest-resource-microbiome-data-analysis/ or contact Nick Weber at nick.weber@nih.gov.

New CEO for NIH Clinical Center

Introducing James Gilman, M.D.

NIH NEWS RELEASE, DECEMBER 9, 2016

James K. Gilman, new CEO for the NIH Clinical Center.

NIH Director **Francis S. Collins** announced the selection of Major General **James K. Gilman**, U.S. Army (Retired), as the inaugural chief executive officer (CEO) of the NIH Clinical Center. Gilman, who is a cardiologist and has rich experience in commanding the operations of many hospital systems, is expected to join NIH in early January 2017.

"Dr. Gilman's...medical expertise and military leadership will serve the NIH Clinical Center well as it continues to strive for world-class patient care and research excellence," said Collins.

As CEO, Gilman will oversee the day-to-day operations and management of the 200-bed Clinical Center, which had approximately 6,000 inpatient admissions and 100,000 outpatient visits last year. Every patient at the Clinical Center is on a research protocol. Gilman will focus particularly on setting a high bar for patient safety and quality of care, including the development of new hospital operations policies.

Gilman served 35 years in the U.S. Army, most recently as commanding general of the U.S. Army Medical Research and Materiel Command, Fort Detrick (Frederick, Maryland). He led several Army hospitals—Brooke Army Medical Center (Fort Sam Houston, Texas); Walter Reed Health Care System (Washington, D.C.); and Bassett Army Community Hospital (Fort Wainwright, Alaska). He also served as Director of Health Policy and Services in the Office of the Surgeon General, U.S. Army Medical Command. He has received numerous military awards and decorations, among them the Distinguished Service Medal, the Legion of Merit, and the Meritorious Service Medal.

Gilman holds a bachelor of science in biological engineering from Rose-Hulman Institute of Technology (Terre Haute, Indiana) and received his M.D. from the Indiana University School of Medicine (Indianapolis). He completed a residency in internal medicine and a fellowship in cardiovascular diseases at Brooke Army Medical Center, where he later became chief of cardiology. He is board certified in internal medicine with a subspecialty in cardiovascular disease.

After his retirement from the U.S. Army in 2013, Gilman was executive director of Johns Hopkins Military and Veterans Institute in Baltimore until June 2016.

"I especially want to thank Dr. **John Gallin** who, after many years as Clinical Center director, has taken on the new role of NIH associate director for Clinical Research and chief scientific officer," said Collins. "This critical position is essential to ensuring that NIH continue its record of extraordinary scientific accomplishments in a world-class research setting." ●

Seriously Big Tanks

New Water Storage Systems

ADAPTED FROM THE *NIH RECORD*, MARCH 11, 2016

What are those big holes in the ground? Construction began on March 1, 2016, on an industrial water-storage (IWS) system and a thermal-energy storage (TES) system—both on the south side of campus—that will greatly increase the efficiency and reliability of the NIH Central Utility Plant (CUP). The projects are intended to ensure that NIH research and patient care can continue uninterrupted if there is an unexpected power outage or disruption in public utility services.

Large research campuses such as NIH require a reliable chilled water supply to control building temperature and humidity to rigorous specifications and to operate critical equipment. Without this ability, many NIH functions would have to be curtailed. Currently, the Washington Suburban Sanitary Commission supplies water to NIH.

The IWS system includes a 5-million-gallon water tank at parking lot 41 and will supplement the existing 5,000-ton chillers and cooling towers in the CUP. The tank, 65 feet high and 120 feet in diameter, will increase water capacity and provide a backup for chilled feed water to offset evaporation. It will also provide boiler feed water. The IWS system will allow NIH to meet the need for water for a few days if a water-supply interruption occurs.

Construction is also underway for a second, larger water facility, the TES system, on the Building 34 site. It will hold 8 million gallons of chilled water and stand 100 feet high, with the same diameter as the IWS tank. Building 34, the old campus utility plant, will be demolished. Construction on both the IWS and the TES systems is expected to be completed by October 2017. ●

Read more online at https://irp.nih.gov/catalyst/v25i1/news-briefs.

Yo-Yo Ma

CONTINUED FROM PAGE 1

Before performing their surprise duet, the two men had been singing the praises of the connection between music and science on topics such as memory and creativity. They noted that both researchers and artists must strive to freely share information to enhance their work and society. Too much competition—whether it's among scientists or luthiers—can lead to more secretive methods, a decrease in collaboration and cooperation, and an overall reduction in quality. Ma described how the quality of stringed instruments began to decline after 1735 when instrument makers began competing and keeping secrets from one another.

"That sounds like science," laughed Collins.

Collins delighted Ma with a study that appeared in the journal *Neuron* about scientists who had identified distinct neural pathways in the auditory cortex that respond to music and not to other sounds (*Neuron* **88:**1281–1296, 2015). The research was also featured in the February 8, 2016, edition of the *New York Times* in "New Ways into the Brain's 'Music Room,'" by science writer Natalie Angier.

Ma surprised Collins by asking questions about the methods used in the study, alluding to the fact that music arouses more than our sound detectors but speaks to our souls. Both men agreed that the euphoria we feel when listening to music that we enjoy is a universal experience (*Nat Neurosci* **14:**257–262, 2011). These moments of pleasure can be found in science, too, such as the first "eureka" moment. Scientists are on a perpetual search to replicate that euphoria; Ma hypothesized that "musicians are people looking for a particular state of mind for society."

The conversation twisted and turned among topics, but Ma's pathway through life and music was a topic that resurfaced several times. Born in Paris to Chinese parents and raised in America, Ma has always sought to find his place in the world as an immigrant between cultures and, by extension, between European and Chinese music. His interest in the "edge effect," where cultures meet, serves as a starting point for creating new music. When asked what drove him to explore music beyond the traditional Bach for the cello, Ma responded, "confusion, curiosity, pigheadedness." Collins and the crowd agreed that those are traits that serve scientists well, too.

But those traits alone aren't enough. Ma emphasized the importance of incorporating artistic elements into our everyday thinking. The current educational focus on analytical thinking via STEM programs (science, technology, engineering, and math) leaves out an important letter: A for the arts. "The arts, culture, and humanities give us perspective and the capacity for empathy and humility," said Ma at the Nancy Hanks Lecture on Arts and Public Policy in 2013. "We know that the best decision makers employ great critical thinking skills with a great capacity for empathy."

Beyond Ma's passion for creating new music as a "venture culturalist," he is on a mission to incorporate the arts into education, business, and everyday life. He created a nonprofit called Silkroad, a nod to his exploration of music made along the Silk Road trade route between Europe and China. Silkroad and its ensemble of musicians create and perform cross-cultural music, develop educational programs, and collaborate with Harvard Business School to enhance education in the arts by training teachers.

Self-proclaimed Ma superfan **Ronald Kohanski**, deputy director of the National Institute on Aging, compared the cellist to the Dalai Lama who is "a kind person with profound intelligence, humor, and wisdom." After Ma's NIH appearance, "I felt I had seen the Dalai Lama with a cello." ●

The videocast of this lecture is at https://videocast.nih.gov/launch.asp?20036 (NIH only).

NIH ABBREVIATIONS

CBER: Center for Biologics Evaluation and Research, FDA
CC: NIH Clinical Center
CCR: Center for Cancer Research, NCI
CDC: Centers for Disease Control and Prevention
CIT: Center for Information Technology
DCEG: Division of Cancer Epidemiology and Genetics, NCI
FAES: Foundation for Advanced Education in the Sciences
FARE: Fellows Award for Research Excellence
FelCom: Fellows Committee
FDA: Food and Drug Administration
FNL: Frederick National Laboratory
IRP: Intramural Research Program
HHS: U.S. Department of Health and Human Services
NCATS: National Center for Advancing Translational Sciences
NCBI: National Center for Biotechnology Information
NCCIH: National Center for Complementary and Integrative Health
NCI: National Cancer Institute
NEI: National Eye Institute
NHGRI: National Human Genome Research Institute
NHLBI: National Heart, Lung, and Blood Institute
NIA: National Institute on Aging
NIAAA: National Institute on Alcohol Abuse and Alcoholism
NIAID: National Institute of Allergy and Infectious Diseases
NIAMS: National Institute of Arthritis and Musculoskeletal and Skin Diseases
NIBIB: National Institute of Biomedical Imaging and Bioengineering
NICHD: Eunice Kennedy Shriver National Institute of Child Health and Human Development
NIDA: National Institute on Drug Abuse
NIDCD: National Institute on Deafness and Other Communication Disorders
NIDCR: National Institute of Dental and Craniofacial Research
NIDDK: National Institute of Diabetes and Digestive and Kidney Diseases
NIEHS: National Institute of Environmental Health Sciences
NIGMS: National Institute of General Medical Sciences
NIMH: National Institute of Mental Health
NIMHD: National Institute on Minority Health and Health Disparities
NINDS: National Institute of Neurological Disorders and Stroke
NINR: National Institute of Nursing Research
NLM: National Library of Medicine
OD: Office of the Director
OITE: Office of Intramural Training and Education
OIR: Office of Intramural Research
ORS: Office of Research Services
ORWH: Office of Research on Women's Health
OTT: Office of Technology Transfer

NIEHS Science Days Festival Celebrates Research

Nuclear Hormone Receptors Featured

BY KELLY LENOX, NIEHS

STEVE MCCAW, NIEHS

Science Days lead organizer Joel Abramowitz congratulated NIEHS visiting fellow Mahita Kadmiel (left), who won the best-talk award for her lecture explaining that glucocorticoids are critical for the proper formation of the cornea.

The National Institute of Environmental Health Sciences (NIEHS) held its annual celebration of science, Science Days, on November 3–4, 2016. This year's theme was nuclear hormone receptors, which mediate environmental impacts on the body. Speakers included NIEHS researchers, trainees, a grantee, and a former trainee who now directs her own lab. Nearly 100 posters were featured and awards were presented for best trainee talk and poster as well as for mentor and trainee of the year.

Spotlight on trainees: "Science Days gives us a chance to spotlight trainees and give them opportunities to present their research in talks and posters," said **Joel Abramowitz**, special assistant to the NIEHS scientific director and lead organizer of the event. New to the festival this year were offerings from the Division of Extramural Research and Training (DERT) grant experts, including three talks and a resource room for people with questions about grants.

"We wanted to provide our trainees [with] the same information that we share at scientific society meetings," said **Kimberly McAllister**, who organized the DERT presentations.

Nuclear hormone receptors mediate environmental impacts: The science talks explored nuclear hormone receptors as mediators of environmental impacts on the body. This family of transcription factors, which regulate gene expression, can be disrupted by chemicals that mimic hormones or by diseases, such as diabetes and obesity, that alter hormonal signaling.

"The minisymposium really showed the breadth of NIEHS research," said NIEHS Scientific Director **Darryl Zeldin**. "We heard outstanding scientists talk about state-of-the-art topics and novel approaches to understanding how the environment affects our health."

Sex differences in endocrine disruptors: NIEHS grantee Heather Patisaul, from North Carolina State University (Raleigh, North Carolina), studies endocrine disruptors and social behavior in prairie voles, whose behaviors are closer to that of humans than other animal models are. "We and others have reported behavioral effects of developmental BPA [bisphenol A] exposure, including elevated anxiety and exploratory behavior, and many of those effects are sexually dimorphic," she explained. In future research, Patisaul wants to further study exposure timing and focus on the placenta as a target for the chemicals.

Endometriosis, BPA, and BPAF: Former NIEHS trainee **Katie Burns**, now at the University of Cincinnati College of Medicine, studies connections between endometriosis and exposures to endocrine disruptors, such as bisphenol AF (BPAF), a substitute used in BPA-free products.

Using a mouse model of endometriosis that she developed at NIEHS, Burns's findings are consistent with other researchers, who have shown that BPAF is more estrogenic than BPA. She shared early results of a study in which BPAF increased the size of endometrial lesions. In future studies, Burns hopes to characterize the molecular processes involved.

Computational approaches speed chemical screening: "Now I'm going to take you up to the 30,000-foot view, to figure out how we tackle the fact that we are living in a sea of chemicals," said **Nicole Kleinstreuer**, deputy director of the National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods.

Computational toxicology enables scientists to study more chemicals faster, and with fewer animals, than with traditional approaches. Kleinstreuer discussed predictive models of hormone signaling pathways, highlighting the U.S. Environmental Protection Agency's approval of new endocrine assays. "This is the first time any regulatory agency has accepted high-throughput screening data and computational model output as an alternative to an animal test," Kleinstreuer said. "That's pretty exciting."

Trainee talks: Trainees from NIEHS laboratories, branches, and research programs presented science talks ranging from epidemiology and clinical studies to cell signaling and DNA repair. **Mahita Kadmiel**, in the Signal Transduction Laboratory (STL), won the best talk award for her lecture explaining that glucocorticoids are critical for proper formation of the cornea. To read brief summaries of the other talks and find out who else won awards, read the online edition of the *NIH Catalyst*. ●

Read more at https://irp.nih.gov/catalyst/v25i1/niehs-science-days-festival-celebrates-research.

An Equation for Global Health Equity

Dr. Paul Farmer Gives 2016 Barmes Lecture

BY LESLEY EARL, NCI

To improve global health equity, "what you really need are the staff, stuff, space, and systems," said physician Paul Farmer, co-founder of the nonprofit Partners in Health and professor and chair of the Department of Global Health and Social Medicine at Harvard Medical School (Boston). "Research has to be linked to training, [to] local capacity building, and to actually taking care of people."

This was a recurrent theme for Farmer who delivered the 2016 David E. Barmes Global Health Lecture on November 16. Farmer "has been one of the leading voices for opportunities in health to the whole globe," noted NIH Director **Francis Collins**.

Partners in Health provides health care to the poor in 10 developing countries, including Haiti and Rwanda, and supports health-care systems by building medical facilities, conducting research, and training local staff.

During the early years of his career, Farmer traveled frequently back and forth between Boston, where he was training, and Haiti. At that time, the 1990s, antiretroviral therapies (ART) were just becoming available, and the differences between care for those with human immunodeficiency virus or AIDS in Boston versus those in Haiti were striking.

Some protested that providing drugs like ART in low-resource countries was unsustainable, recalled Farmer. "But think about the absurdity of trying to use the word 'sustainability' as a diagnosis to decide whether yes or no, that person should receive the only treatments we have for a particular lethal infection or one that causes great suffering."

After the 7.0 earthquake rocked Haiti in 2010, the country's health-care system and already weak medical infrastructure were hit hard. "I said, 'We're going to build a major medical center in central Haiti,'" said Farmer. Today, University Hospital in Mirebalais serves patients from across Haiti and helps train new health-care providers.

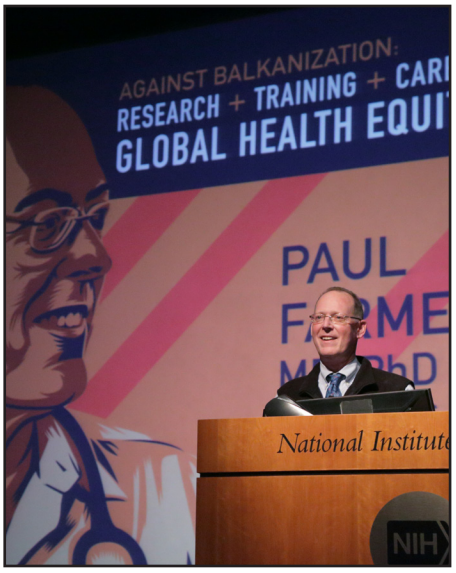
During the most recent Ebola outbreak in West Africa, Farmer and his Partners in Health colleagues assisted with research and care in Sierra Leone. Arriving in Port Loko, a city 45 miles east of the Sierra Leone capital of Freetown, they were sent to an abandoned building that was serving as an Ebola treatment unit.

"There is no electricity, there's no walls," said Farmer. "No running water, no drainage." But while other groups in places like Liberia spent a great deal of time and money on custom-built buildings that arrived too late to house patients, Partners in Health and the other groups at Port Loko worked with what was already there.

Partners in Health has also been bringing research, training, and care to Rwanda for several years, supporting its health-care system in a variety of ways.

In Rwanda, "people are suffering from not having access to research, advanced technologies, [or] advanced treatments," said **Jean Utumatwishima**, a visiting fellow at the National Institute of Diabetes and Digestive and Kidney Diseases, who attended Farmer's talk. Utumatwishima was the director of the Kinihira Provincial Hospital in Rwanda, which works closely with a cancer center for excellence run by Partners in Health. "Partners in Health has brought a new dynamic of training people," he said. It's providing "on-the-job training."

"There's an urgency to address [health-equity] issues quickly, and we can't wait; we need to do it now," said **Martha J. Somerman**, director of the National Institute of Dental and Craniofacial Research (NIDCR), which, along with the Fogarty International Center (FIC), sponsors the Barmes Lecture. NIDCR, she said, is hoping to work with FIC Director **Roger Glass** as well as Farmer to generate new global health-equity initiatives.



BILL BRANSON

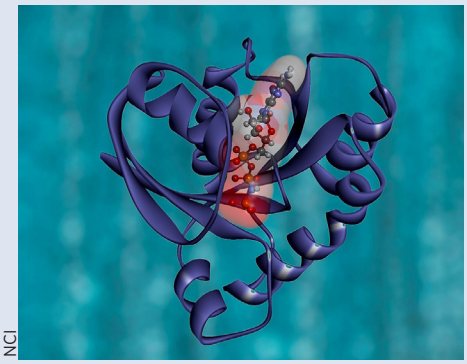
Physician Paul Farmer, who is known for his humanitarian work providing health care to the poor in developing countries and is a co-founder of the nonprofit Partners in Health, gave an an inspiring talk at NIH recently on improving global health equity.

"We live in one body. We live in families, and we live in communities. We're connected across borders," said Farmer. "When you have the staff, stuff, space, and systems that you need, not only can you do better research to find out what's going on, you can actually make a great difference in people's lives." ●

The annual David E. Barmes Global Health Lecture, sponsored by NIDCR and FIC, was established in 2001 to honor the late David Edward Barmes, an ardent and lifelong supporter of global health. To watch a videocast of Paul Farmer's talk, "Against Balkanization: Research + Training + Care = Global Health Equity," held on November 16, 2016, go to https://videocast.nih.gov/launch.asp?20007.

Read more online at https://irp.nih.gov/catalyst/v25i1/an-equation-for-global-health-equity.

Intramural Research Briefs



NCI

An illustration of the KRAS protein, with blue helices wrapping around a core of balls and sticks.

NCI: CELLULAR IMMUNOTHERAPY TARGETS A COMMON HUMAN CANCER MUTATION

In a study of an immune therapy for colorectal cancer that involved a single patient, a team of researchers at NCI identified a method for targeting the cancer-causing protein produced by a mutant form of the *KRAS* gene. This targeted immunotherapy led to cancer regression in the patient. Mutations in the *KRAS* gene are thought to drive 95 percent of all pancreatic cancers and 45 percent of all colorectal cancers. (NIH authors: E. Tran, P.F. Robbins, Y. Lu, T.D. Prickett, J.J. Gartner, L. Jia, A. Pasetto, Z. Zheng, S. Ray, E.M. Groh, I.R. Kriley, and S.A. Rosenberg, *N Engl J Med* **375**:2255–2262, 2016)

NHLBI: NEW METHOD FOR PERFORMING AORTIC-VALVE REPLACEMENT

Scientists at NHLBI have developed a new, less-invasive way to perform transcatheter aortic-valve replacement (TAVR), a procedure widely used to treat aortic-valve stenosis, a lethal heart condition. The new approach, called transcaval access, will make TAVR more available to high-risk patients, especially women, whose femoral arteries are too small or too diseased to withstand the standard procedure. The new method was tested in a trial on 100 patients at 20 hospitals across the United States and proved successful in 99 patients. (NIH author: R.J. Lederman, *J Am Coll Cardiol* **63**:2795–2804, 2016)

NINDS AND NIAID: CEREBRAL MALARIA'S DEADLY AGENTS

Using state-of-the-art brain-imaging technology, NINDS and NIAID scientists filmed what happens in the brains of mice that developed cerebral malaria. The results reveal the processes that lead to fatal outcomes of the disease and suggest an antibody therapy that may treat it. (NIH authors: P.A. Swanson, G.T. Hart, M.V. Russo, T. Yazew, M. Peña, S.K. Pierce, and D.B. McGavern, *PLoS Pathog* DOI:10.1371/journal.ppat.1006022)

NIDCD: HEARING-LOSS DECLINING

Hearing loss among U.S. adults aged 20 to 69 has declined over the past decade, even as the number of older Americans continues to grow, according to a new NIDCD study. The researchers do not know why hearing-loss prevalence is declining but speculate possible factors include fewer manufacturing jobs, increased use of hearing protectors, less smoking, and advances in health including better medical care to manage risk factors associated with hearing loss. (NIH authors: H. Hoffman, K. Losonczy, and C. Themann, *JAMA Otolaryngol Head Neck Surg* DOI:10.1001/jamaoto.2016.3527)

NCCIH: VETERANS ENDURE HIGHER PAIN SEVERITY THAN NONVETERANS

American veterans experience higher prevalence of pain and more severe pain than nonveterans, with young and middle-aged veterans suffering the most, according to a new analysis of the National Health Interview Survey by the lead epidemiologist at the NCCIH. This survey provides the first national estimate of severe pain associated with painful health conditions in veterans and nonveterans and underscores the importance of sustaining efforts to monitor and manage pain among veterans. (NICCH author: RL Nahin, *J Pain* DOI:10.1016/j.jpain.2016.10.021)

NCI AND FDA: NO SAFE LEVEL OF SMOKING

NCI researchers analyzed data on over 290,000 adults and found that people who consistently smoked an average of fewer than one cigarette per day over their lifetimes had a 64 percent higher risk of earlier death than never smokers, and those who smoked between one and 10 cigarettes a day had an 87 percent higher risk of earlier death than never smokers. (NIH authors: M. Inoue-Choi, L. Liao, P. Hartge, N. Caporaso, and N. Freedman; FDA author: C. Reyes-Guzman, *JAMA Intern Med* DOI:10.1001/jamainternmed.2016.7511)

NCATS, CC, AND NIAID: FINDING THERAPIES AGAINST DRUG-RESISTANT BACTERIA

Researchers at NCATS, NIAID, and the Clinical Center developed an assay to rapidly screen thousands of drugs to determine how effective they were against resistant bacteria. Of the approximately 4,000 compounds screened, 25 suppressed the growth of two drug-resistant strains of *Klebsiella pneumoniae* that have become resistant to most major types of antibiotics. (NIH authors: W. Sun, R.A. Weingarten, M. Xu, N. Southall, S.Dai, P.Shinn, P.E. Sanderson, P.R. Williamson, K.M. Frank, and W. Zheng, *Emerg Microbes Infect* 5:e116, 2016; DOI:10.1038/emi.2016.123)

NHGRI, NEI: FASTER WOUND HEALING

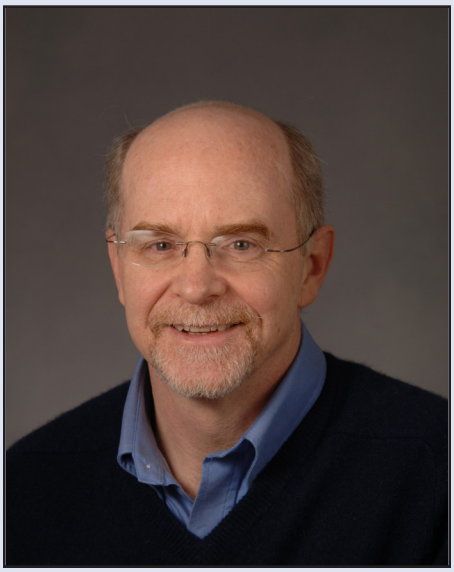
NHGRI and NEI researchers have identified a novel role for a protein known as heat shock protein 60 (Hsp60), finding that it is critical in tissue regeneration and wound healing. The study found that topical treatment of an Hsp60-containing gel dramatically accelerates wound closure in a diabetic mouse model. (NIH authors: W. Pei, S.C Huang, L. Xu, B. Liu, J. Sinclair, J. Idol, G.K. Varshney, R.B. Nussenblatt, and S.M. Burgess, NPJ Regen Med DOI:10.1038/npjregenmed.2016.13) ●

Read more online at https://irp.nih.gov/catalyst/v25i1/research-briefs.

Innovations: John O'Shea and Arthritis Drug

Government Collaboration with Industry Helps Drug Development

BY ADAM THOMAS



At the Chen Lecture, NIAMS scientist John O'Shea described how he collaborated with industry to develop tofacitinib, a drug used to treat rheumatoid arthritis.

You may have seen ads on television for Xeljanz (tofacitinib), a drug used to treat rheumatoid arthritis. Don't ask me where the name came from. But I can tell you that the drug itself was the brainchild of NIH physician and immunologist **John O'Shea**. O'Shea, who is the scientific director of the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), described his work at the Philip S. Chen, Jr. Distinguished Lecture on Innovation and Technology Transfer on October 14.

Chen and members of his family were in the audience and thoroughly enjoyed O'Shea's talk. Chen spent four decades at NIH, established the NIH Office of Technology Transfer, and created the Cooperative Research and Development Agreement (CRADA).

The CRADA has become an essential component of technology transfer and allows NIH researchers to collaborate with industry scientists. Essentially, it gives private companies access to the wealth of information produced in government research laboratories while also preserving the intellectual property rights of that company. The government, for its part, has access to the financial backing and mass-production capabilities of industry.

"The CRADA [is] an exceptionally effective mechanism for government collaboration with industry," said O'Shea.

He described how the development of tofacitinib began as an informal discussion with Paul Changelian of Pfizer in 1993. O'Shea found that getting an industry perspective on his drug research was invaluable. Equally important were Changelian's efforts to champion the project. Changelian had the scientific insight from his previous academic work in immunology as well as the right contacts at Pfizer to set things in motion.

At the time, Changelian and Pfizer were searching for kinases. These are proteins that transfer phosphate groups to other proteins, typically to activate them. As luck would have it, O'Shea's research team had recently discovered a new kinase called Janus kinase 3 (JAK3), which had drug-target potential. The JAK family encompasses a group of kinases (JAK1, JAK2, JAK3, and TYK2) that are important in multiple cell-signaling pathways. To communicate with each other during an immune response, cells secrete proteins called cytokines, which bind to receptors on the surfaces of other cells. The external binding activates internal JAKs, which help convey messages to the nucleus and activate target genes. Because cytokines are key to the immune response, O'Shea and Changelian hypothesized that JAK inhibitors could potentially treat autoimmune disorders or prevent organ rejection in transplant patients.

That informal discussion between the two scientists (at a 1993 immunology meeting in Vermont) initiated a nearly two-decades-long process that included identifying potential inhibitors, testing them in animals and humans, and finally FDA approval of tofacitinib in 2012. The drug is prescribed for the treatment of moderate to severe rheumatoid arthritis, but additional work suggests that it could be effective in treating other forms of arthritis, inflammatory bowel disease, psoriasis, autoimmune alopecia, and lupus.

O'Shea pointed out that the NIH-Pfizer collaboration continues to be valuable. Through the current collaboration, Pfizer has access to the NIH Clinical Center for lupus clinical trials that can inform decisions in the pharmaceutical industry. Meanwhile, the NIH gains a valuable ally in that industry and a conduit to large-scale production.

"The perception is that it is hard for government scientists to work with industry," said O'Shea. "But both sides being committed can make it happen."

It's through this kind of collaboration, made possible by the CRADA, that drugs like tofacitinib can make it to the market. ●

For more about John O'Shea and his work, go to https://irp.nih.gov/pi/john-oshea.

RICHARD WYATT, OIR

Phil Chen (left) and his family as well as Deputy Director for Intramural Research, Michael Gottesman (right), enjoyed a talk by John O'Shea (center) at the Philip S. Chen, Jr. Distinguished Lecture on Innovation and Technology Transfer.

Stadtmans

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showed how manipulating the immune system's inflammatory response, rather than the bacteria, could be an effective treatment for tuberculosis. And **Robin Stanley** (NIEHS) solved the co-crystal structures of a ribosome bound to certain antibiotics used against multidrug-resistant tuberculosis.

Following are lightly edited responses to some of the questions that the *NIH Catalyst* posed to the new Stadtmans. Read more online at https://irp.nih.gov/catalyst/v25i1/trans-nih-recruits.

SHAHINAZ GADALLA, M.D., PH.D., NCI-DCEG

Earl Stadtman Investigator, Clinical Genetics Branch, National Cancer Institute—Division of Cancer Epidemiology and Genetics

Education: Ain Shams University School of Medicine in Cairo, Egypt (M.B.BCH., M.D. equivalent); University of Maryland, Baltimore (M.S. and Ph.D. in epidemiology)
Training: Cancer Prevention Fellow, NCI-DCEG
Came to NIH: In 2007 to complete Ph.D. dissertation; in 2008 joined NCI's Cancer Prevention Fellowship Program for postdoctoral training; promoted to staff scientist in 2011; became Earl Stadtman investigator in 2014
Website: https://irp.nih.gov/pi/shahinaz-gadalla

What is your research?

I focus on two areas of research: 1) understanding the drivers of cancer in patients with myotonic dystrophy, the most common type of adult muscular dystrophy, and applying our discoveries to improved patient care; and 2) identifying biomarkers that can predict clinical outcomes in patients who receive allogeneic hematopoietic cell transplants, and testing how to use the biomarkers to improve clinical care.

How did you become interested in science?

As a young student, I enjoyed science classes, maybe to fulfill my curiosity in understanding the world. I wanted to be a doctor. Soon after I completed my clinical training, I realized that in spite of all the great clinical advances that have been made, there is still a lot to be done. I wanted to help direct patient care through research. I decided to complement my medical education with a degree in epidemiology, which provided me with the skills for proper research methodology.

What discoveries have you made?

I published the first epidemiological evidence that patients with myotonic dystrophy are at high risk of certain cancers (*JAMA* **306:**2480–2486, 2011). For my work in hematopoietic-cell transplantation, I discovered that, in young patients with severe aplastic anemia, longer donor leukocyte telomere length was associated with higher post-transplant survival (*JAMA* **313:**594–602, 2015).

What's nice about working in the IRP?

I enjoy the stimulating scientific environment and the opportunity for team science.

What is most exciting about your work?

It's most exciting when our findings have clinical applicability.

What's hot in your field right now?

Understanding disease heterogeneity and identifying modifiers of risk.

What do you like to do outside of work?

Spend time with friends and family.

If I had more time I would…

Engage more in activities to help children with special needs.

What's the hardest lesson you've learned?

You don't know what life is going to give you or take from you. Be prepared and accommodative, and keep going.

Would you like to tell us anything else?

I want to tell young scientists "Make sure you love and enjoy what you do."

ROMINA GOLDSZMID, PH.D., NCI

Earl Stadtman Investigator, Cancer and Inflammation Program, National Cancer Institute; Adjunct Investigator, Laboratory of Parasitic Diseases, National Institute of Allergy and Infectious Diseases

Education: University of Buenos Aires, Buenos Aires, Argentina (M.S. in biochemistry; Ph.D. in tumor immunology)
Training: Visiting student, Laboratory of Cellular Physiology and Immunology, Rockefeller University (New York); postdoctoral visiting fellow, Laboratory of Parasitic Diseases, NIAID
Came to NIH: In 2004 for training; became a staff scientist in NCI in 2009 and a Stadtman Investigator in 2015
Website: https://ccr.cancer.gov/romina-goldszmid

What is your current research?
Understanding the mechanisms governing the development, functional maturation, and dynamics of the mononuclear phagocyte (MP) populations and the critical signals that regulate them during tumor development, response to cancer therapy, or encounters with pathogens. We are also interested in the role of the microbiota and their impact on the response to cancer therapy or pathogens.

How did you become interested in science?
As a kid, I would say, "When I grow up I want…to discover new drugs to cure cancer." In college, I became fascinated by the immune system and wondered why it couldn't fight cancer the same way it could fight invading pathogens. I first worked on cancer vaccines, then immunity and infection, and finally a combination of both.

Have you made significant discoveries?
My colleagues and I showed for the first time that the gut microbiota control the response to cancer immunotherapy and chemotherapy by modulating myeloid-cell functions in the tumor microenvironment (*Science* **342:**967–970, 2013).

What is most exciting about your work?
The creative freedom and that I'm constantly learning from my peers, my mentors, and my students.

What's hot in your field right now?
Cancer immunotherapy; the microbiome; and the interaction between commensal microbes and the host immune system.

What do you like to do outside of work?
I enjoy being a mom! Most of my time outside of work is devoted to my two-year-old son and my husband. I also like dancing tango, reading, traveling, cinema, and theater.

If I had more time I would …
Dance more, travel more, read more, and most importantly I would spend more time with my family and friends both here and back home in Argentina.

What's an important lesson you've learned?
When we are passionate about what we do, we enjoy and suffer with the same intensity.

What about you might surprise people?
I used to be an actress and split my time between the lab and the stage. I was part of a theater company that brought plays to schools and public libraries in disadvantaged areas, orphanages, and retirement homes. It was one of the most rewarding experiences.

ASTRID HAASE, M.D., PH.D., NIDDK

Earl Stadtman Investigator, Acting Section Chief, RNA Biology Section, Laboratory of Cell and Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases

Education: University of Vienna, Austria (M.D.); University of Basel, Switzerland (Ph.D. in biochemistry)
Training: Postdoctoral fellow, Cold Spring Harbor Laboratory (Cold Spring Harbor, N.Y.)
Came to NIH: In 2015
Website: https://irp.nih.gov/pi/astrid-haase

What is your current research?
Understanding the fundamental mechanisms that survey and guard genomic integrity. We study how small, noncoding RNAs guard the genomic stability of our most precious cells in the germline.

How did you become interested in science?
In medical school, I wanted a better understanding of the molecular underpinnings of diseases. I also wished to contribute to improved diagnostics and therapies. My Ph.D. supervisor, was a pioneer in the field of RNA interference (RNAi). As a postdoc at the Cold Spring Harbor Laboratory, I did research on the mechanisms of small-RNA silencing.

What discoveries have you made?
As a graduate student, I discovered the TAR-RNA binding protein as an essential partner of human Dicer and defined its role in miRNA silencing. As a postdoc, I identified the novel nuclease activity of PLD6 and characterized its function.

What is most exciting about your work?
Starting my own group as a tenure-track investigator is a dream come true. It is a unique opportunity to explore fundamental biological concepts, translate these principles into technology and therapy, and share ideas with colleagues and students.

If I had more time I would …
Travel to explore places and meet interesting people.

What's an important lesson you've learned?
That brilliant people achieve exceptional things through hard work and dedication, and always strive to do better.

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Stadtmans

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KATRIN D. MAYER-BARBER, PH.D., NIAID

Earl Stadtman Investigator, Laboratory of Clinical Infectious Disease, National Institute of Allergy and Infectious Diseases

Education: University of Würzburg in Würzburg, Germany (Ph.D. in biology); thesis work at the Trudeau Institute in Saranac Lake, N.Y.
Training: Postdoctoral fellow, Laboratory of Parasitic Diseases, NIAID
Came to NIH: For training in 2007
Website: https://www.niaid.nih.gov/lab-sections/5549

What is your current research?

My lab is studying how inflammation is regulated at the cellular level, which innate immune cells participate in certain types of inflammatory responses, and how inflammation can determine the outcome of pulmonary infections.

How did you become interested in science?

When I was a first grader, my favorite thing was making "grass and flower soup" in my pretend outdoor cooking area. But it turned out that I had severe hay fever, allergies, and atopic dermatitis. I became curious about how allergies work. I learned about cells and lipid mediators and cytokines that can control the allergic reactions. In college, I did a rotation in an immunology lab that studied allergic airway inflammation in mice. For my Ph.D. and postdoctoral work, I studied inflammation in pulmonary viral and bacterial infections.

Have you made any discoveries?

My proof-of-concept studies with **Alan Sher** (NIAID) exemplified how modulating the host-inflammatory response can improve the outcome in tuberculosis.

What are the advantages to working in the IRP?

It offers absolute scientific freedom and gives us the ability to take projects to the next level. It's great being able to translate basic-research findings into clinical studies in conjunction with the NIH Clinical Center and worldwide networks of collaborators.

What's hot in your field right now?

Trying to understand the inflammatory events that happen during the first couple of weeks after exposure to *Mycobacterium tuberculosis* before adaptive immunity kicks in.

What do you like to do outside of work?

Before we had our son, my husband (**Daniel Barber**, a 2010 Stadtman Investigator in NIAID) and I liked riding our motorcycles through the countryside. Nowadays we like to spend time with our three-year-old son.

ROBIN STANLEY, PH.D., NIEHS

Earl Stadtman Investigator, Head, Nucleolar Integrity Group, National Institute of Environmental Health Sciences

Education: Yale University, New Haven, Conn. (Ph.D. in molecular biophysics and biochemistry)
Training: Postdoctoral fellow at the National Institute of Diabetes and Digestive and Kidney Diseases
Came to NIH: In 2009 for training; In 2014, joined NIEHS
Website: https://www.niehs.nih.gov/research/atniehs/labs/stl/pi/nucleolar/

What is your current research?

My lab is investigating the dynamics of the nucleolus with a particular emphasis on how it regulates the ribosome assembly pathway. Eukaryotic ribosome biogenesis is a complex process; dysfunction of this pathway gives rise to a group of human diseases known as ribosomopathies; and deregulation of the pathway had been linked with human cancers.

How did you become interested in science?

My two favorite subjects growing up were science and math. When I went to college (University of North Carolina at Charlotte), I double-majored in chemistry and math. During my freshman year in college I started searching for a chemistry research lab to join, and my one big requirement for the lab was that it require lots of math. I ended up working in an X-ray crystallography lab. The most exciting thing about crystallography is looking at electron-density maps and being the first to visualize what a molecule looks like at atomic resolution.

Have you made any significant discoveries?

In graduate school, we obtained well-diffracting crystals of the bacterial 70S ribosome and solved several co-crystal structures. I also solved the co-crystal structures of the ribosome bound to the antibiotics viomycin and capreomycin, which are used against multidrug-resistant tuberculosis.

What is most exciting about your work?
Running my own independent lab is super exciting. It is so much fun to come up with a hypothesis and then get to go into the lab and test it out.

Is there anything you can look back on now and realize it was significant?
When I was an undergraduate, I spent three summers working at the Naval Research Lab, in Washington, D.C., with two of the world's greatest crystallographers. I didn't realize at the time what an amazing opportunity that was, but the experience inspired me to pursue a Ph.D. so I could run my own lab.

What's hot in your field right now?
Cryo-electron microscopy (cryoEM), in which cells and tissues are studied at very low temperatures. CryoEM lets you see structures at near-atomic resolution.

What do you enjoy doing outside of work?
Spending time with my husband and four-year-old daughter; going for long runs.

If I had more time I would …
Sleep. After catching up, I would go to the library and grab a huge stack of books to read just for fun. I used to be a voracious reader. I'm a fan of 19th-century female authors—Jane Austen, Elizabeth Gaskell, the Brontë sisters, and Louisa May Alcott.

What's the hardest lesson you've learned?
That protein crystallography requires lots and lots of patience and has an incredibly high failure rate.

What about you might surprise people?
I've run the Boston Marathon three times.

BRITTON TRABERT, PH.D., NCI-DCEG

Earl Stadtman Investigator, Metabolic Epidemiology Branch, National Cancer Institute—Division of Cancer Epidemiology and Genetics

Education: Emory University, Atlanta (M.S.P.H. in epidemiology); University of Michigan, Ann Arbor, Mich. (M.S. in biostatistics); University of Washington, Seattle (Ph.D. in epidemiology)
Training: Sallie Rosen Kaplan Postdoctoral Fellow, NCI
Came to NIH: In 2009 for training
Website: https://irp.nih.gov/pi/britton-trabert

What is your research?
The role of exogenous and endogenous hormones in cancer and the relationship between chronic inflammation and gynecologic cancers. We are also studying the long-term effects of fertility treatment, in particular whether ovulation-inducing drugs or in vitro fertilization procedures are associated with increased cancer risk. In addition, we are trying to understand the role of anti-inflammatory medications, particularly low-dose aspirin, in reducing ovarian cancer risk.

How did you get interested in your field?
My journey into epidemiology began with an undergraduate course entitled "Insects and Our Health." My research has evolved from studying sexually transmitted infections and benign reproductive morbidities to investigating the hormonal and inflammatory etiology of cancer.

What is most exciting about your work?
That I get to do something I really enjoy.

What discoveries have you made?
We determined that aspirin may reduce the risk of ovarian cancer and that postmenopausal circulating estrogens are associated with rare subtypes of ovarian cancer.

What's hot in your field right now?
Disease heterogeneity, which is particularly relevant for ovarian cancer. Ovarian cancer is a very heterogeneous disease and likely originates from the fallopian tubes. Identifying and clarifying disease heterogeneity will help us to better understand important etiologic clues that will inform ovarian cancer prevention, early detection, and treatment.

What do you like to do outside of work?
Cook, entertain, and work on projects around the house. I am currently restoring the wood doors in our 1920s row house.

If I had more time I would …
Go to medical school. I'd train in obstetrics and gynecology with a focus on gynecologic oncology; such training would complement my research and would likely give me a different perspective.

What's the hardest lesson you've learned?
That simply doing high-quality research isn't enough. We have to be the champions of our own research findings and communicate them to the public.

What about you might surprise people?
That I am handy. I can fix almost anything from doorknobs to toilets. My current favorite tool is the laser level. ●

Recently Tenured

AIMÉE KREIMER, NCI-DCEG

KARIN E. PETERSON, NIAID

HARI SHROFF, NIBIB

LI YANG, PH.D., NCI-CCR

AND MANY MORE TO COME

AIMÉE KREIMER, PH.D., NCI-DCEG

Senior Investigator, Infections and Immunoepidemiology Branch, National Cancer Institute—Division of Cancer Epidemiology and Genetics

Education: University of Delaware, Newark, Del. (B.S. in animal science, biology; concentration in pre-veterinary medicine); University of Virginia, Charlottesville, Va. (M.S. in health evaluation sciences); Johns Hopkins Bloomberg School of Public Health, Baltimore (Ph.D. in infectious disease epidemiology)

Training: Postdoctoral research at the International Agency for Research on Cancer (Lyon, France) and in the NCI Cancer Prevention Fellowship Program

Came to NIH: In 2004 for postdoctoral training; in 2008 became tenure-track investigator

Selected professional activities: Adjunct associate professor, Otolaryngology, Head and Neck Surgery Department, Johns Hopkins (Baltimore); member of the HPV Vaccine Work Group, which advises the Advisory Committee on Immunization Practices, CDC

Outside interests: Spending time with her family (husband Brad; children Ben, Luca, and Kaya; and her mom and dad) and their two dogs (Peanut and Coco); cooking; dancing; walking and hiking outdoors

Website: https://irp.nih.gov/pi/aimee-kreimer

Research interests: My research focuses on the etiology and prevention of human papillomavirus (HPV) infection and associated cancers at multiple sites including the cervix, anogenital region, and oropharynx. HPV is one of the most important human carcinogens, causing some 300,000 cancer deaths per year worldwide. Most of these deaths are due to cervical cancer and occur in low-income countries. The HPV prophylactic vaccines could dramatically reduce the burden of HPV-associated cancers. However, current global vaccination rates are insufficient to meaningfully affect the incidence of these cancers.

I am the co-principal investigator for the NCI Costa Rica HPV Vaccine Trial Long Term Follow-up Study. My colleagues and I have demonstrated that, after four years of follow-up, vaccine efficacy against persistent infection with HPV type 16 or 18 was comparably high among women who received three, two, or even a single dose of vaccine. Other studies are similarly suggesting that one dose of the HPV vaccine may be sufficient.

It would be a huge public-health breakthrough if one dose was enough; one-dose vaccination could dramatically lower the barriers to vaccination in the poorest world regions. My NCI colleagues and I are planning studies to follow up on this important discovery. Our goal is to document the minimum number of doses truly needed to induce durable protection against HPV infections.

In the United States, the HPV vaccine holds great promise for reducing HPV-caused cancers in the generation currently being vaccinated (girls ages 9–26; boys ages 9–21). But we will still experience decades' worth of these cancers while we wait for vaccinated cohorts to age into the periods when HPV-related cancer is most likely to occur.

We are particularly concerned about the rising rates of oropharyngeal cancer (OPC) linked to HPV; median age at diagnosis is around 55 years. Although effective screening exists for cervical cancer, we have yet to establish an effective approach for the early detection and prevention of OPC. However, my colleagues and I discovered that the E6 antibody marker of HPV type 16 predicts the risk of HPV-driven cancer, especially OPC, years before the cancer develops. I am conducting additional research to determine whether screening for noncervical HPV-driven cancers is feasible and warranted.

If you have been recently tenured, the *NIH Catalyst* will be contacting you soon about including you on these pages. It's a great way for your colleagues to get to know about you and your work.

KARIN E. PETERSON, PH.D., NIAID

Senior Investigator and Chief, Neuroimmunology Section, Laboratory of Persistent Viral Diseases, Rocky Mountain Laboratories (Hamilton, Mont.), National Institute of Allergy and Infectious Diseases

Education: University of Wisconsin–River Falls, River Falls, Wis. (B.S. in biotechnology); University of Missouri–School of Medicine, Columbia, Mo. (Ph.D. in molecular microbiology and immunology)

Training: Postdoctoral training in Laboratory of Persistent Viral Diseases, Rocky Mountain Laboratories, NIAID

Before coming to NIH: Assistant professor, Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University (LSU; Baton Rouge, La.)

Came to NIH: In 1998 (through 2003) for training; in 2008 as a tenure-track investigator and chief of the Neuroimmunology Section in NIAID's Rocky Mountain Laboratories

Selected professional activities: Academic editor, *PLOS ONE*; editorial board, *Microbial Pathogenesis*; adjunct or affiliate faculty member at LSU School of Veterinary Medicine and at the University of Montana

Outside interests: Bicycling; serving on the board of the Supporters of Abuse Free Environment (SAFE) domestic violence shelter; playing for the Hamilton Wild Things women's football team; cross-country skiing

Website: https://irp.nih.gov/pi/karin-peterson

Research interests: Viral infection in the central nervous system (CNS) can lead to neuronal damage and the development of neurological diseases. My laboratory examines how the immune and nervous systems respond to virus infection and how these responses affect the development of neurological diseases. We use several animal models to examine viral infections in the CNS.

Our primary studies investigate LaCrosse Virus (LACV), which is the leading cause of arboviral encephalitis in children in the United States. LACV is transmitted by the bite of an infected mosquito, and most cases occur in the upper Midwestern, mid-Atlantic, and southeastern states. Many people infected with LACV show no symptoms or have very mild forms of the disease. However, severe neurological disease can occur after LACV infection, most often in children under the age of 16. Our lab studies how LACV gains access to the brain; how LACV induces damage to neurons in the brain; and the role of the immune response in these processes.

Our lab also studies other viruses that infect the CNS, including retroviruses, herpesvirus, and more recently, Zika virus. Through our work with these viruses, we have identified mechanisms of both neuronal damage and neuronal protection that are mediated by the immune system's interactions with CNS cells. We are currently examining the regulation of these pathways and mechanisms in order to inhibit viral pathogenesis in the CNS. The ultimate goal of our research is to identify targets for therapeutic treatment of viral-mediated neurological diseases.

HARI SHROFF, PH.D., NIBIB

Senior Investigator and Chief, Section on High Resolution Optical Imaging, National Institute of Biomedical Imaging and Bioengineering

Education: University of Washington, Seattle (B.S.E. in bioengineering); University of California at Berkeley, Berkeley, Calif. (Ph.D. in biophysics)

Training: Postdoctoral research under Eric Betzig (awarded the 2014 Nobel Pize in Chemistry) Howard Hughes Medical Institute's Janelia Farm Research Campus (Ashburn, Va.)

Came to NIH: In 2009

Selected professional activities: Course director, Optical Microscopy in the Biomedical Sciences and taught both neurobiology and physiology courses at the Marine Biological Laboratory (Woods Hole, Mass.); directing the new trans-NIH Advanced Imaging/Microscopy (AIM) facility

Outside interests: Rock climbing; playing board games; hiking; and reading (currently reading an inspiring history of the Wright Brothers)

Website: https://irp.nih.gov/pi/hari-shroff

Research interests: My team develops optical-imaging tools to do real-time studies of three-dimensional (3-D) cellular and developmental processes. We aim to improve the performance of 3-D optical (especially fluorescence) imaging microscopes in resolution, depth, speed, and phototoxicity.

To address resolution and depth, we developed multifocal structured illumination microscopy (MSIM), a version of structured illumination microscopy (SIM). SIM techniques use patterned excitation light and post-processing to double the resolution of a conventional microscope. Unlike other super-resolution techniques, SIM provides resolution enhancement at a relatively low illumination dose. With newer implementations of MSIM, we can image specimens even faster (at hundreds of frames per second) and at even greater depths (more than 200 micrometers from the coverslip surface).

To improve the speed and reduce the phototoxicity associated with live 3-D imaging, we developed an implementation of selective plane illumination microscopy (SPIM). SPIM techniques combine a perpendicular excitation/detection geometry with light-sheet excitation, drastically reducing photobleaching and damage while providing higher signal-to-noise ratio and acquisition rates than confocal microscopy. SPIM has been difficult to use, however, because the geometry is cumbersome, and samples must be prepared in a special way.

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Recently Tenured

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So we developed a user-friendly module—inverted selective plane illumination microscopy (iSPIM). The module retains the advantages of SPIM, but can be attached to an epifluorescence microscope, and samples can be conventionally mounted on glass coverslips. More recently, we have improved the resolution of iSPIM by adding a second specimen view (dual-view iSPIM, diSPIM), thereby enabling imaging with isotropic spatial resolution (down to 330 nanometers). Further improvements in spatial resolution are imminent.

We are also working with extramural neuroscientists, scientists, and developmental biologists to understand how a nervous system develops. Using diSPIM to follow all neurons in the developing nematode embryo, we intend to create the first digital atlas of neurodevelopment.

In addition, I am creating a trans-NIH advanced imaging and microscopy (AIM) facility where our precommercial custom-built systems can be made available to the rest of the NIH. Please get in touch with me if you have an imaging challenge or would like to use the facility. We collaborate closely with intra- and extramural researchers (both academic and commercial) to ensure that our microscopes can be both easily and widely used.

These are some of the recently tenured investigators who will be featured in an upcoming issue of the *NIH Catalyst*:

- Theo Heller, NIDDK
- Jianxin Shi, NCI-DCEG
- Luigi Notarangelo, NIAID
- Sandra Wolin, NCI-CCR
- Choonsik Lee, NCI-DCEG
- Jose Feraldo-Gomez, NHLBI
- Kumaran Ramamurthi, NCI-CCR
- And more

LI YANG, PH.D., NCI-CCR

Senior Investigator and Head, Tumor Microenvironment Section, Laboratory of Cancer Biology and Genetics, National Cancer Institute–Center for Cancer Research

Education: Sichuan University, Chengdu, China (B.S. in biology); Wuhan University, Wuhan, China (M.S. in developmental biology and cell biology); Vanderbilt University School of Medicine, Nashville (Ph.D. in cancer biology)

Training: Postdoctoral training at Department of Medicine and Department of Cancer Biology, Vanderbilt University School of Medicine

Before coming to NIH: Research assistant professor, Department of Medicine and Department of Cancer Biology, Vanderbilt University School of Medicine

Came to NIH: In 2009 as principal investigator in Laboratory of Cancer Biology and Genetics, NCI-CCR

Selected professional activities: Ad hoc reviewer for several journals; editorial board, *PLOS ONE* and *International Journal of Biological Sciences*; visiting professor, North Sichuan Medical College (Nanchong, China)

Outside interests: Gardening; hiking; traveling

Website: https://irp.nih.gov/pi/li-yang

Research interests: Tumor metastases account for most cancer-associated deaths. Unfortunately, there are few effective treatment options. My group uses molecular and genetic approaches in mouse models to study the complex molecular programs that govern the inflammatory tumor microenvironment in the progression of tumor metastases. We mainly focus on two areas of research: the identification of the metastasis-promoting mediator of transforming growth factor–beta (TGF-beta); and inflammation, tumor progression, and metastases.

In our first area of research, we have been tackling a longstanding challenge in cancer biology: understanding how TGF-beta, which is overexpressed in advanced human cancers, switches from a tumor suppressor to a tumor promoter. We discovered that the loss of TGF-beta signaling in epithelial cells induces inflammation and the recruitment of myeloid (bone marrow) cells into the tumor microenvironment. Myeloid TGF-beta signaling is an essential component of the metastasis-promoting activity of TGF-beta.

This observation, however, is in stark contrast to previously reported tumor-suppressing roles of TGF-beta in fibroblasts and epithelial cells. In these types of cells, the deletion of Tgfbr2, the gene for TGF-beta receptor–2—or of genes for the downstream mediators of TGF-beta signaling—accelerates tumor progression. We were the first to discover that tumor suppressors possess a novel anti-inflammatory function. Our findings may contribute to the development of novel treatments for metastasized cancer.

In our second area of research, we demonstrated that cancer-associated inflammation mediates the epigenetic silencing of the kinase inhibitor p21 in tumor progression. We also highlighted the underlying molecular mechanisms of epithelial cancer that are due to alterations in stromal cells. We are now investigating how the inflammation in the tumor microenvironment reprograms metastatic cancer cells through DNA methylation, histone modifications, microRNA expression, and other epigenetic mechanisms. These inflammation-induced epigenetic alterations may enhance genomic instability and genomic heterogeneity and thus allow for the emergence of metastatic malignant cell variants. Our studies will provide insight into the mechanisms of tumor heterogeneity and drug resistance, one of the greatest obstacles in cancer treatment. ●

NEWS FROM AND ABOUT THE SCIENTIFIC INTEREST GROUPS

New Technologies to Improve Global Health

NIH Global Health Interest Group Hosts Symposium

BY AMY KULLAS, NIAID

Portable technologies, Earth-observing satellites, developmental economics, social media, and infrastructure improvements are all playing a role in improving global health. The NIH Global Health Interest Group invited experts to explore these topics at a symposium held on October 24, 2016.

Innovations: **Krishna Kandarpa** (National Institute of Biomedical Imaging and Bioengineering, NIBIB) highlighted NIBIB innovations that are ideal for resource-limited settings: the iScope and a low-cost magnetic resonance imaging (MRI) machine. The iScope is a microscope that can be mounted on a mobile phone to detect abnormalities in a patient's blood and can even diagnose cancer in less than 40 minutes and for less than $1.80 per patient. The low-cost, compact, 3.0-tesla MRI machine uses flexible MRI radiofrequency coils that produce high-quality images and in the future could lead to shorter scan times. Its weight is one-fourth that of a traditional MRI machine, and it takes up half the space.

Satellites: Satellite technology is being used to understand the planet's changing climate and to predict or confirm outbreaks, according to NASA program manager John Haynes. The International A-Train, a convoy of six satellites (from the United States and other countries), takes measurements of temperature, water vapor, and rainfall. It has instruments that offer three-dimensional views of clouds and airborne particles, and it produces high-resolution vertical maps of greenhouse gases and other atmospheric constituents. Scientists have been able to use this technology to monitor the developments of El Nino and other weather events. Haynes described other programs that provide predictive models for environmental management, disaster response, and climate-change adaptation. Another program analyzes weather and other data to improve the forecasting of mosquito-borne disease outbreaks, such as West Nile virus and Zika.

Economic motivators: Developmental economist Sarah Baird (George Washington University) described a cash-transfer program for adolescent girls in Malawi. She found that although cash transfers can generate a wide variety of benefits for adolescent girls at the time they are received, many of these benefits do not last.

Social media: Social media, especially when integrated with traditional communication approaches, could improve health by increasing interactions between patients and their health-care providers, explained global-media specialist Silvio Waisbor (George Washington University). For example, being able to communicate via FaceTime with a psychiatrist could be beneficial in African countries that have only one psychiatrist for the entire country.

Infrastructure: Although developing new technologies and innovations is important, it's also essential to strengthen the basic infrastructure in developing countries, said Keith Martin, a physician and the executive director of the Washington, D.C.-based Consortium of Universities for Global Health. For example, 40 percent of the hospitals in Liberia do not have such fundamentals as sanitation, soap, and electricity. Martin suggested that one way that NIH could help is by training health-care workers in developing countries. ●

For more information on the SIG or to join the LISTSERV, visit https://sigs.nih.gov/global-health/Pages/default.aspx or contact Gyan "John" Prakash at prakashg@mail.nih.gov.

NEW SIG: NEUROSCIENCE CLINICAL TRIALS

The Neuroscience Clinical Trials interest group will facilitate the NIH-wide exchange of ideas and experiences related to the planning and conducting of clinical trials in clinical neurosciences. This exchange includes the sharing of best practices across individual institutions, jointly discussing areas that would benefit from coordinated efforts (for example, the establishment of standards across NIH), and offering a forum for presentation and discussion of research projects and initiatives involving innovative approaches to the methodology of clinical trials.

The group formed as one outcome of an annual retreat that included institutes doing intramural research in the clinical neurosciences (NINDS, NIMH, NIDA, NIAAA, NIA, NINR, NCCIH, and others). By becoming a SIG, the group is opening itself to interested participants and contributors from within and beyond the NIH intramural research program. Activities will include regular meetings as well as a LISTSERV to announce meetings and clinical-trials-related activities across NIH (such as seminars and fellowship opportunities).

For more information or to be added to the LISTSERV, contact Dietrich Haubenberger at haubenbergerd@ninds.nih.gov.

DEMYSTIFYING MEDICINE COURSE

The course, which runs from January through May, bridges the gap between advances in biology and their application to major human diseases. Each session includes clinical and basic science components presented by a veritable all-star cast of NIH PIs, such as Tony Fauci, Nora Volkow, and John Gallin, as well as prominent scientists from across the country. All are welcome to attend any lecture. See the upcoming schedule at https://demystifyingmedicine.od.nih.gov.

Former NIH scientists and other NIH-affiliated people who died in 2016.

King Bhumibol Adulyadej of Thailand (died on October 13, 2016, at 88) was the world's longest-serving modern monarch, ruling for seven decades. He visited NIH on June 30, 1960, to dedicate the new building for the Division of Biologic Standards, Building 29. He was invited to participate in the dedication ceremonies because of his active role in health measures in his own country as well as in the NIH Cholera Research Project.

Cornelius B. Alexander (died on April 20, 2016, at 84) was a research microbiologist at NIAID for 40 years until his retirement in 2007. He contributed to work on genetics of antibodies, first in mice and then in rabbits.

Carolyn Bondy (died on September 14, 2016, at 71) was chief of the NICHD Developmental Endocrinology Branch until her retirement in 2012. Her early work concerned insulin-like growth factors in brain development and reproduction. Later she investigated how sex-chromosome genes contribute to normal human development and gender-based differences in susceptibility to congenital heart, autoimmune, and coronary diseases.

Lisa Christine Bowes (died on July 9, 2016, at 47) worked as a research librarian at NLM.

Roscoe Owen Brady (died on June 13, 2016, at 92), who worked at NIH from 1954 to 2006, was a retired chief of NINDS's Developmental and Metabolic Neurology Branch. For more than 50 years, he conducted research on hereditary metabolic storage diseases such as Gaucher disease and Niemann-Pick disease. He and his research team developed diagnostic tests, carrier-identification procedures, and methods for prenatal detection of these disorders that provided the basis for genetic counseling to at-risk families. In 1991, his team established the first effective treatment—enzyme replacement therapy—for Gaucher disease.

Robert Lewis "Bob" Bruun (died on June 11, 2016, at 73), a former NIAMS executive officer, served for more than 22 years as a commissioned officer in the Public Health Service (PHS).

Charles Delmus Butler (died on June 13, 2016, at 81) worked as a recreation therapist for 30 years in the Clinical Center's Rehabilitation Medicine Department until 2006.

Claire M. Callahan (died on February 11, 2016, at 88) worked at NIAAA in a collaborative program with NIDA, overseeing the development of curricula to educate primary-care physicians, nurses, psychologists, social workers, and other health-care professionals to prevent and treat addiction.

Laurence P. Clarke (died on April 16, 2016, at 72), chief of the Image Technology Development Branch in NCI's Cancer Imaging Program, came to NIH in 1999. He was a leader in medical-imaging technology for cancer and championed the advancement of bringing quantitative imaging into clinical trials.

Gregory Curt (died on July 31, 2016, at 64), a noted cancer researcher, did research on high-grade gliomas, drug resistance in cancer cells, and fatigue in cancer patients. He came to the NCI in 1980 as a medical oncology fellow; later served as deputy director of the NCI Division of Cancer Treatment; was appointed NCI clinical director in 1989; and left NIH in 2002 for AstraZeneca Oncology, where he served as senior director and alliance manager for the NIH.

David R. Davies (died on September 1, 2016, at 89), who worked at NIDDK from 1955 to 2012, was widely considered to be one of the greatest innovators in the field of X-ray crystallography. Among the first to structurally characterize nucleotides and important classes of proteins such as antibodies and toll-like receptors, he was intricately connected with some of the most significant scientific discoveries to arise from the NIH campus. His structural identifications served as a platform for Nobel Laureate **Marshall Nirenberg**'s cracking of the genetic code and Lasker winner **Michael Potter**'s contributions to the development of monoclonal antibodies, among other great advances.

Catalina Ramos Delgado (died on December 19, 2016, at 58) came to NIH in 2003 as a staff nurse and subsequently became a research nurse for NHLBI specializing in oncology-hematology.

Harry Michael Doukas (died on January 3, 2016, at 96) retired from NIH's Division of Research Grants; he spent more than 30 years in government service.

David Alexander Drachman (died on December 5, 2016, at 84) led pioneering work to define the diagnosis and treatment of Alzheimer disease.

Dale Birkle Dreer (died on March 12, 2016, at 60), who came to NIH in 2001 from academia, was chief of NCCIH's Office of Scientific Review. His scientific expertise was on brain structure and function, particularly the consequences of exposure to drugs and environmental insults.

Robert L. Eskay (died on August 13, 2016, at 72) worked at NIAAA as a research scientist from 1976 until he retired in 2014. As chief of NIAAA's Section on Neurochemistry, he made several key discoveries related to the important relationship between ethanol and endocrine regulation, notably of the hypothalamic-pituitary-adrenal axis.

Robert Westcott "Dr. Bob" Frelick (died on September 1, 2016, at 96) left private practice in 1982 and became program director for NCI's Community Clinical Oncology Program until 1987. He helped establish the Association of Community Cancer Centers, which facilitated community hospitals' use of proven protocols for treating various forms of cancer and thereby allowing cancer patients to stay closer to home.

Mark Flanders Gourley (died on September 17, 2016, at 58) was the director of the NIAMS Rheumatology Fellowship and Training Branch until his retirement in 2013. His experience at NIH began when he did a nine-week immunology rotation as a medical student. In 1988 he returned to NIH as an NIAMS rheumatology fellow, eventually conducting the landmark study that established cyclophosphamide as the standard of care in the treatment of lupus nephritis. He later was a clinical investigator in NIEHS and focused on the environmental causes of autoimmune diseases.

Gerald "Jerry" Hecht (died on November 24, 2016, at 88) was a photographer at the NIH from 1959 to 1987. Many of his photographs were displayed in science journals and newspaper articles about NIH research advances.

Kuo-Ping "K.P." Huang (died on February 29, 2016, at 74) was chief of NICHD's Section on Metabolic Regulation from 1984 until 2014. He made several major contributions to the understanding of brain function, cell signaling, and the body's control of metabolism.

Ostler H. Laster (died on April 4, 2016, at 90), who spent more than 40 years at NIH, was a training officer and later a diversity program manager in the Office of Equal Opportunity. He also served on the committee that implemented plans for the first NIH day-care center.

Heinrich Malling (died on May 23, 2016, at 85), a genetic toxicologist in NIEHS, was one of the first to investigate in vitro methods for converting potentially mutagenic chemicals to their metabolically active forms.

Vincent Manganiello (died on January 10, 2016, at 76) joined NHLBI in 1968 and later became chief of the Laboratory of Biochemical Physiology. He studied cyclic nucleotide phosphodiesterases (PDEs) and showed regulatory roles for PDE3A in fertility, platelet aggregation, myocardial contractility, and vascular tone.

Paul Nettesheim (died on January 16, 2016, at 82), a pulmonary biologist who came to NIEHS in 1977, made seminal contributions to the understanding of the adverse effects of environmental agents on the respiratory system.

Robert Nussenblatt (died on April 17, 2016, at 67) was chief of NEI's Laboratory of Immunology and served as NEI scientific director through most of the 1990s. He arrived at the NIH as a clinical associate in 1977 and was the first to use the immunosuppressive agent cyclosporine to treat uveitis, the inflammation of the uvea and surrounding areas in the eye. Later he demonstrated the effectiveness of the immunosuppressant daclizumab to treat uveitis. The use of daclizumab has since been adapted for the treatment of multiple sclerosis. He also made major contributions to the development of treatments for AIDS-related eye disease and the immunological aspects of age-related macular degeneration.

Donald Dennis Price (died on September 7, 2016, at 74), a scientist at NIDCR from 1974 to 1979, combined the disciplines of neurophysiology, psychology, and experiential science in an effort to connect the neurophysiological mechanisms and psychological experience of pain.

Richard Hudson Quarles (died on August 9, 2016, at 77) was an internationally renowned neuroscientist, who retired in 2007 after 39 years at NINDS. His research was on the myelin-associated glycoproteins (MAG); he was the first to identify a glycoprotein known as P0 as the major protein of peripheral myelin. His laboratory produced the first antisera to MAG.

George Frederick Russell, Jr. (died on March 20, 2016, at 85) worked more than 30 years at NIH. He was s the Director of Management Policy and helped plan the Children's Inn.

Alexis Shelokov (died on December 16, 2016, at 97) brought some of the first tissue-culture techniques to NIAID where he worked with the polio virus starting in 1950. He introduced the roller-tube technique, which involved growing a monolayer of cells in nutrient media–filled tubes in a rotating drum. He was chief of NIAID's Laboratory of Tropical Virology in the 1950s and 1960s until he moved to Panama to set up the Middle America Research Institute as part of the U.S. Public Health Service.

Thressa "Terry" Stadtman (died on December 11, 2016, at 96) was a senior investigator and former chief of the Section on Intermediary Metabolism and Bioenergetics in the NHLBI Laboratory of Biochemistry. She made seminal discoveries on the role of vitamin B12 and the physiological functions of selenium and selenocysteine, the latter an amino acid she discovered. In a career spanning nearly 60 years, she became known as the "mother of selenium biochemistry"; she demonstrated that selenium is an essential constituent of several enzymes in prokaryotes. She and her husband, **Earl Stadtman**, were one of the first husband-and-wife scientist pairs at the NIH, arriving in 1950. Earl Stadtman, who died in 2008, was a renowned NIH biochemist and mentor to two Nobel laureates and many elected members of the National Academy of Sciences.

Glennwood Trivers (died on September 26, 2016, at 82) was a research biologist in NCI's Laboratory of Human Carcinogenesis from 1956 until his retirement in 2013.

Joy Ann Williams (died on November 18, 2016, at 55) was a staff scientist in NCI who helped advance the understanding of the biology of thymic development.

Robert Emerson Windom (died on October 21, 2016, at 86) served as the United States Assistant Secretary for Health and Human Services under President Ronald Reagan from 1986 to 1989.

Barbara Evelyn Wright (died on June 23, 2016, at 90), a microbiologist at NIH (1953–1961), was a pioneer in sports kayaking. ●

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FROM THE ANNALS OF NIH HISTORY

NIH Female Surgeon, A Pioneer in Heart Surgery

In 1960, **Nina Starr Braunwald**, who was the first woman to be board-certified as a cardiac surgeon, led the NIH team that was the first to replace a human mitral valve (which she also designed). She went on to develop a cloth-covered mechanical valve (the Braunwald-Cutter valve), which was implanted into thousands of patients during the late 1960s and early 1970s; the stented aortic homograft (a graft of same-species tissue) for mitral valve replacement; a surgical treatment of chronic thromboembolic disease; and pioneering techniques for the use of tissue cultures to discourage the formation of clots when prosthetic valves and circulatory assist devices are in use. Braunwald worked at the National Heart, Lung, and Blood Institute from 1958 to 1968; then she moved to the University of California, San Diego (1968–1972) and later to Harvard Medical School (Boston). In the photo, she is shown adjusting a test chamber holding an artificial heart valve. ●

JERRY HECHT

To read more about Nina Braunwald and the photographer, Jerry Hecht, who died in November 2016, go to https://irp.nih.gov/catalyst/v25i1/from-the-annals-of-nih-history.

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