THE NIH CATALYST

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Inclusion of People with Disabilities in Technology Research and Development

A WALS Talk by Rory Cooper

BY *NIH CATALYST* STAFF

Rory Cooper knows wheelchairs. He's been using them since he was 20, after a bicycle accident in 1980 while serving in the U.S. Army in Germany left him with a spinal injury limiting the mobility of his legs.

He knows how cumbersome wheelchairs can be. He knows how they can tear up your arms. He knows what a bear it can be folding them and lifting them into a car, particularly when you don't have full use of your legs. He knows they don't do well in the rain. He knows that common motorized wheelchairs are not something you can take into a waterpark without the threat of electrocution.

And he knows that making better wheelchairs for those who depend on them can unlock human potential otherwise constrained for lack of accessibility and inclusion.

You may know these things, too, but you likely don't feel them the way Cooper and his diverse staff of engineers and scientists and administrators at the University of Pittsburgh feel them—because many of them live with inaccessibility and exclusion every day.

Cooper, who founded and leads the Human Engineering Research Laboratories (HERL), a partnership between the University of Pittsburgh and the Department of Veterans Affairs, made his case clear for diversity and inclusion in the sciences in a Wednesday Afternoon Lecture Series talk

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Beauty Is in the Eye of the Gecko

Using Geckos and Other Lizards to Accelerate Clinical Vision Research

BY LESLEY EARL, NEI

CREDIT: ASHLEY RASYS AND ANDREW WEGERSKI, NEI

Gecko eyes have features that mimic the human eye and are being used by **Robert Hufnagel's** lab to study vision disorders. Shown: The gecko species *Gonatodes antillensis*.

The go-to lab animals to study many human eye diseases tend to be mammals—a mouse or a rat for example—because of their similar evolution and genetics compared to humans. But for diseases that affect a part of the eye called the fovea, which provides high-acuity central vision in humans, scientists are beginning to look further afield.

Clinician-scientist **Robert Hufnagel**, Director of the National Eye Institute's Ophthalmic Genomics Laboratory and Chief of the Medical Genetics and Ophthalmic Genomics Unit,

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Great Mentors and Mentees Are Made, Not Born

BY NINA F. SCHOR, M.D., PH.D., DDIR

I WAS ONCE ASKED BY A STUDENT HOW old one has to be to no longer need mentors. I answered, "If there is such an age, I have not yet reached it." My answer was both heartfelt truth and glib retort. I don't know how the student took it, but this brief encounter got me thinking about the concept and practical reality of having and being a mentor.

Mentor, of course, is a given name from Greek mythology: Mentor was appointed by Odysseus to look after and guide Odysseus's son, Telemachus, while Odysseus fought in the Trojan War. This was an explicit assignment born of a relationship between Odysseus and Mentor of trust and alignment of values. But as I think of those I consider my mentors over the years, I doubt many of them would use that term to describe what they did for me.

Before I went to college, my mentors included my parents and schoolteachers. I think even now of standout teachers who nurtured my curiosity and creativity, gave me confidence in my judgement, and weren't afraid to tell me when I needed to go back to the drawing board. In college, those I thought of as mentors asked me the really hard questions that challenged me and supported and encouraged me to persist when I was "close but no cigar."

In graduate school (The Rockefeller University in New York), Dr. Anthony Cerami was my thesis mentor, but many others also guided various aspects of my work and career aspirations. In medical school (Weill Cornell Medical College in New York), a handful of professors welcomed me to their "club" long before I was worthy of that honor and ensured that I was invited to see the right patients, attend the right conferences, and meet the right faculty members to acquire the skills and knowledge I would need going forward. Finally, as a resident and faculty member in three different academic institutions, I depended on a few experienced colleagues and guides to get me through challenges and career-growth experiences.

> Over the course of one's career, the number, identities, and roles of mentors and the nature of the relationship between the mentors and the "mentee" should evolve and change.

Perhaps Dr. Cerami thinks of himself as my mentor, as our relationship was an explicit and formal one documented on the title page of my thesis! But I doubt that any of the others, many of whom I have remained in touch with long after I left their institutions, would think of themselves as such.

Today's trainees tend to think of a mentor as someone with whom one has a formal agreement and arrangement, someone explicitly designated or chosen as a mentor. To some extent, this is a good thing. It implies reciprocal obligation and responsibility and increases the likelihood of regular, structured dialogue. But I would hate to think that anyone feels restricted to mentors with whom they have a formal connection. Over the course of one's career, the number, identities, and roles of mentors and the nature of the relationship between the mentors and the "mentee" should evolve and change.

No one is born knowing how to be a mentor or how to be a mentee. It takes role models (both positive and negative), experience and practice, critique from others who have mentored or been mentored previously, and a mutual commitment between mentor and mentee to work at it and to make it work.

Several situations and behaviors can ruin any mentor-mentee relationship. For example, competition between the mentor and the mentee is a dangerous condition. The mentor and mentee must be playing on the same team and the team's aim must be the success of the mentee and the consequent success of the scientific pursuit of knowledge. Also, ridicule, embarrassment, or public rebuke never motivated anyone to do better or work for their team. (Dirty laundry belongs in the laundry

room with the door closed, not out in the open for others to see.) A mentor should always be thinking about how to motivate mentees to do better and to strive for excellence. That frame of mind also means it's neither helpful nor wise to tolerate less than the best effort or letting mediocre science slide by in the interest of avoiding teaching a tough lesson.

Mentees need to be proactive, too, including being both respectful and open with a mentor. Mentees are responsible for a large measure of the direction of their learning, experience, project, career direction, and science. Mentees should come to a formal meeting with their mentor prepared with an agenda, a progress report, and a list of questions and discussion items. This is a dialogue; neither person can do it alone.

NIH has long been one of the very best places on the planet at which to be a scientist. And many of us are here to help you: your mentors; your team; the Training Directors at your Institutes or Centers (ICs); Dr. **Sharon Milgram's** team in the Office of Intramural Training and Education; your IC's Scientific and Clinical Directors; and me, the Deputy Director for Intramural Research. Engage with us, call upon us, inform us proactively and before a major challenge or a crisis arises. Anticipate and seek guidance. We all are a resource to you and to each other. Here, as between mentors and mentees, dialogue, respect, and openness are everything! ●

What We're Reading

Articles that Capture the NIH's Role in History or Society

"The NIH-led research response to COVID-19"

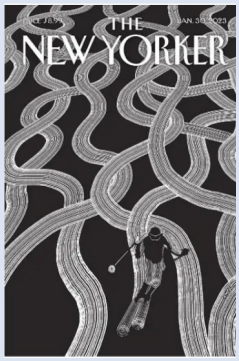
Science, February 2, 2023
https://www.science.org/doi/10.1126/science.adf5167

"Though the COVID-19 pandemic, which has claimed the lives of at least 6.5 million individuals worldwide, is not yet over, it is not too soon to consider the strengths and weaknesses of the research response and some of the lessons that can be learned."

"World's largest body of human geneticists apologizes for eugenics role"

Washington Post, January 24, 2023
https://www.washingtonpost.com/dc-md-va/2023/01/24/geneticists-eugenics-apology/

"The world's largest and best-known group of human geneticists apologized Tuesday for the role some of its early leaders played in the American eugenics movement, as well as the harmful ways the field has been used to fuel racism and discrimination. The 8,000-member American Society of Human Genetics 'seeks to reckon with, and sincerely apologizes for, its involvement in and silence on the misuse of human genetics research to justify and contribute to injustice in all forms,' the 75-year-old organization's board of directors said in a statement."



"Nobody Has My Condition But Me"

The New Yorker, January 30, 2023
https://www.newyorker.com/magazine/2023/01/30/nobody-has-my-condition-but-me

"In early 2021, Dr. **Michael Ombrello**, an investigator at the National Institutes of Health, received a message from doctors at Yale about a patient with a novel genetic mutation—the first of its kind ever seen.... Ombrello was concerned by what first-round genetic tests showed: a disabling mutation in a gene, known as *PLCG2*, that's crucial for proper immune functioning. It was hard to discern how the patient, a forty-eight-year-old woman, had survived for so long without serious infections. Even more puzzling was the sudden onset of severe joint pain and swelling she was experiencing after years of excellent health. He decided to bring her to the N.I.H. campus, in Bethesda, Maryland, to study her case first hand. 'That's how I ended up as a patient in his clinic on a sweet, warming day in April 2021, just as the cherry blossoms in the Washington area were in full bloom.'" [wrote the patient, the author of *The New Yorker* article].

From the Fellows Committee

How to Prepare for the In-Person Conference, Post-Pandemic

BY LARISA GEARHART-SERNA, NCI

"In-person and hybrid events increased 255% between the fourth quarter of 2021 and the second quarter of 2022," and the vast majority of events from 2022 were predicted to have an in-person element, according to *Forbes* Council Member Eran Ben-Shushan in his recent article in *Forbes* titled "In-Person Events Are Back, But They Look Nothing Like They Used To."

Now that we are returning to in-person events en masse, we scientists find ourselves with a large and looming question: What will our beloved, in-person conferences look like? We are faced with uncertainties about what to expect moving forward. Here we have compiled some helpful tips on how best to prepare for in-person conferences, to help you make the most of renewed opportunities to reunite with your colleagues, collaborators, and scientific communities.

Prepare to mask up (or not), based on your own preference

Sofia Bhalwani, a Postbaccalaureate Fellow in the National Cancer Institute, recently went to the HIV Persistence conference in Miami. "I was definitely scared of all the sick people around me," she said. "I didn't realize how I'd notice people coughing and sniffling so much compared to pre-pandemic."

It's true that we are now more conscious than ever of obvious signs and symptoms of illness, and comfort levels with these vary widely. "Wear a mask if you're uncomfortable," said Bhalwani. While masks will likely be optional at conferences, do not be afraid to wear one and maintain social distancing if that is what you prefer. Conferences are not intended to push you out of your COVID comfort zone.

Prepare for the hybrid conference: It's here to stay

The in-person conference, as we once knew it, is gone. Instead, most conferences have adopted or will adopt hybrid approaches.

"Some participants attending in person and others joining online [create] a disparity in attendees' experiences and can take away from the experiences of both," cautioned one *HR Daily Advisor* Contributing Editor in her recent article "Conferences: Is it Time to Get Back on the Road?" Part of this disparity can be attributed to the challenges of inclusion, as conference organizers will have to decide whether to exclude virtual attendees from certain events or to shape all events around a format that can serve online audiences. Even with added complexities, virtual and hybrid formats increase meeting access in a way that was never fully realized before the pandemic. Now that organizers have seen the broad reach of hybrid meetings, it is likely such events are here to stay.

Prepare for each session, each day, and the conference meticulously

Ruth Gotian, in her *Forbes* article "Are You Ready To Return To In-Person Conferences?", admitted that returning to in-person conferences can be awkward. We are no longer accustomed to large, social, structured events. However, she noted a few simple tips that may help, such as arriving early to get a feel for your physical surroundings. Knowing the layout of the conference space can save you from feeling overwhelmed, confused, or anxious. Becoming acquainted with room layouts also lets you know what to expect in terms of presentation format and proximity to other attendees. Further, Gotian noted that mapping out on the schedule what you will be attending can help you take maximum advantage of the opportunities and time that you have. She even suggested contacting persons of interest beforehand, a great way to proactively network.

Prepare to take advantage of in-person networking

In their write-up "ASHG 2022: Re-envisioning the new 'normal' for in-person conferences," the American Society of Human Genetics highlighted that "meeting up again in person offers unmatched opportunities to attend events live, reunite with colleagues and friends, and forge new relationships with peers and mentors." Indeed, events such as conferences are key to professional relationship building. *Forbes* author Eran Ben-Shushan shared that "roughly 80% of professionals agree that networking is crucial to their career success." While Zoom, Webex, and Teams have seen us through our pandemic personal and professional lives, there is just no substitute for real, live human interaction. It's critical to capitalize on networking opportunities at conferences, both formal and informal.

"Just talk to everyone you meet and ask them how they got to where they were," said Bhalwani. "It's really important to be engaged in the conversation and ask questions as needed. The more you do it, the more comfortable you'll get…." ●

Larisa Gearhart-Serna, a Postdoctoral Fellow in the National Cancer Institute's Technology Transfer Center, is a member of The NIH Catalyst *Editorial Board.*

References can be found in the online version of this article at https://irp.nih.gov/catalyst/31/2/the-training-page.

Farewell from the Editor-in-Chief

BY LAURA STEPHENSON CARTER

This issue of *The NIH Catalyst* marks my retirement as Editor-in-Chief. I have been honored to serve in this role for the past 14 years and to have contributed to the NIH mission by keeping everyone informed of advances and services and helping to be a catalyst for scientific collaborations.

It's been a privilege to work with so many wonderful people at NIH where amazing research and patient care is taking place. Many thanks to everyone for helping to make *The NIH Catalyst* a great publication—from the people we feature in our stories; to the many who are responsible for producing and publishing the newsletter, including our volunteer writers; to all the people who indirectly support *The NIH Catalyst*, including colleagues in NIH communications and publications offices and in the Office of NIH History, the Medical Arts team who did the *Catalyst* redesign in 2010, the Intramural Research Program web team, Health and Human Services printing specialists, McDonald and Eudy Printers, those who distribute the *Catalyst* on campus, and to the people in the NIH Mail Center, housekeeping and maintenance services, and many others. And I'm proud of the number of trainees I've mentored and helped find new careers.

I know what it's like to be a patient at NIH, too (actually the wife of one). My husband was part of a research protocol for prostate and bladder cancer. We've been impressed by the excellent and compassionate care provided by the doctors, nurses, researchers, and other NIH Clinical Center staff. Hats off to the wonderful people at Safra Family Lodge as well.

Most of all, I'd like to thank our faithful readers for inspiring me to find the best stories about the NIH research enterprise to share.

I will miss editing *The NIH Catalyst*, but I will be returning as a Special Volunteer in the Office of NIH History, where I'll write about NIH's many past accomplishments. And, by the way, the *Catalyst*, which was launched in February 1993, is celebrating its own 30-year history this year. ●

The NIH Catalyst Celebrates 30 Years

BY LAURA STEPHENSON CARTER


The NIH CATALYST

"Welcome to the first issue of *The NIH Catalyst*, a publication that we have designed for you, the intramural scientists at NIH," the Deputy Director for Intramural Research (DDIR) **Lance Liotta** and editors of the publication announced in the February 1993 issue. "In each issue, this bimonthly newsletter will showcase the excellent scientific research being conducted here at NIH and serve as an interactive communication mechanism where ideas are exchanged, opinions voiced, and issues examined. The purpose is to create a forum that both allows scientists at all levels to advise policy development and promotes cross-fertilization of research insights and collaborations across institutes. Our goal: **Extend the spirit of the NIH Research Festival throughout the year**."

The seed for the *The NIH Catalyst* was planted six years after the Research Festival began in 1986. In 1992, when then-NIH-Director **Bernadine Healy** was interviewing people for Deputy Director for Intramural Research (DDIR), she asked them to write an essay about what they would do in the job.

One of the candidates, **John Gallin**, who was at that time the Scientific Director of the National Institute of Allergy and Infectious Diseases (NIAID), wrote that NIH needed a campus newsletter for intramural scientists and even suggested that it be called the *Catalyst*. Although Healy chose Liotta as DDIR, she liked Gallin's idea so much that she encouraged Liotta to start a publication. He did, named it *The NIH Catalyst*, and invited Gallin to be Deputy Editor. Gallin later became the Director of the NIH Clinical Center and has held other leadership roles, but he has remained an Editor of *The NIH Catalyst*. (Read the interview with Gallin beginning on page 6.)

In that first issue of the *Catalyst*, the editors reported on a new tenure-track policy, plans to renovate Building 41 so it could become a high-containment facility for research on multidrug resistant tuberculosis, conclusions from a task force on the status of women to help improve the NIH environment for women scientists, and several science stories.

The NIH Catalyst has continued to cover stories about intramural researchers and their discoveries, announce scientific resources, and report other news. There were even cartoons in the 1990s: NCI postdoctoral fellow **Alex Dent** entertained readers with humorous comics depicting the challenges of being a postdoc and an NIH scientist. He's now a Professor of Microbiology and Immunology at the Indiana University School of Medicine in Indianapolis. In 2020, the Editors found a cartoonist to create "Nine Types of NIH Zoom Callers," in Dent's style, published in the July-August 2020 issue (https://irp.nih.gov/catalyst/28/4/nine-types-of-nih-zoom-callers).

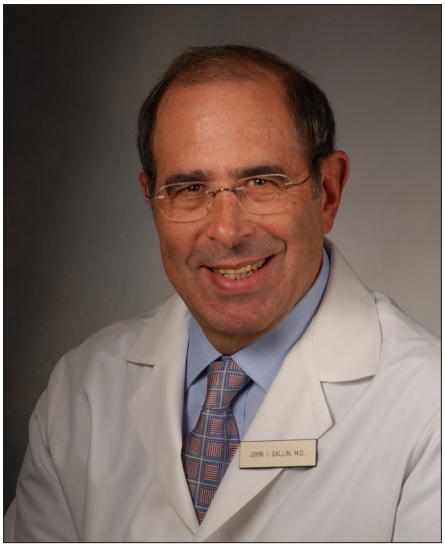
During this year, *The NIH Catalyst* will be highlighting some of the stories that appeared in the earlier years and compare them with what's happening now. The Editors may ask for your help in describing how things have changed at your institute or center since the *Catalyst* was launched in 1993. We hope you also join the conversation on Twitter using the hashtag #NIHCatalyst30. ●

Read more online at https://irp.nih.gov/catalyst/31/2/the-nih-catalyst-celebrates-30-years.

Interview with John I. Gallin, M.D.

Former NIH Clinical Center Director Reflects on His Career at NIH

BY LAURA STEPHENSON CARTER



CREDIT: NIH CLINICAL CENTER

John I. Gallin, M.D.

John Gallin, who is retiring in March 2023 after 52 years at NIH, has been an Editor for *The NIH Catalyst* since it began in 1993. Here he talks with the *Catalyst* about his involvement with the publication and about his own career. After graduating from Weill Cornell Medical College (New York) and completing his residency at New York University's Bellevue Hospital, he came to NIH in 1971 as a Clinical Associate in the National Institute of Allergy and Infectious Diseases' (NIAID's) Laboratory of Clinical Investigation. In 1976, he became a Senior Investigator in NIAID, Chief of the Laboratory of Host Defenses (1991-2003), and later NIAID's Scientific Director (1985-1994). He became the 10th—and longest serving—Director of the NIH Clinical Center in 1994. During his term as Director (1994-2017), he oversaw the construction of a new addition to the hospital (the Mark O. Hatfield Clinical Research Center, which opened in 2005); established the Department of Bioethics; developed a new curriculum for clinical research training that is now offered worldwide; and started the Bench-to-Bedside Awards. In 2011, the NIH Clinical Center was awarded the Lasker-Bloomberg Public Service Award "for serving…as a model research hospital—providing innovative therapy and high-quality patient care, treating rare and severe diseases, and producing outstanding physician-scientists whose collective work has set a standard of excellence in biomedical research."

Gallin is retiring as the NIH Associate Director for Clinical Research, as Chief Scientific Officer of the NIH Clinical Center, and as Chief of the Clinical Pathophysiology Section, Section in the Laboratory of Clinical Immunology and Microbiology, NIAID.

The following has been lightly edited.

CATALYST: How did you get involved with *The NIH Catalyst*?

GALLIN: NIH Director **Bernadine Healy** [NIH Director, 1991-1993], near the end of her term, did a competition for the Deputy Director for Intramural Research [DDIR], after **Ed Rall** retired in 1990. I applied for that and in the application, she asked for an essay of what would you do as DDIR. I said I thought the NIH needed a campus newsletter about intramural research and suggested that it be called the *Catalyst*.

She liked that idea, but she picked **Lance Liotta** as DDIR [in 1993]. She encouraged him to pursue the newsletter idea and he did. He was the Editor and invited me to be the Deputy Editor. I thought Lance did a great job. He had some really interesting ideas, such as his column on emerging technologies.

CATALYST: How has the *Catalyst* changed over the years?

GALLIN: It started off as black and white and we weren't allowed to share it outside NIH. The Editors and the Editorial Advisory Board met several times a year and we would talk about, just as you do now, topics to cover. Sometimes we would invite someone to write an article. When **Michael Gottesman** became the DDIR [in 1994], it underwent some transformation and modernization. He was very interested in the whole idea of the *Catalyst* and began writing columns for almost every issue, which I thought were special. The *Catalyst* became more of a newsletter that chatted with the community—telling people who was there, what was happening. I think transitioning to online and later to color was a big improvement. It's become a real part of the intramural program.

CATALYST: What made you decide to go to medical school?

GALLIN: I didn't apply initially. I wanted to get a Ph.D. and I was excited that I'd been accepted into some graduate programs. My dad urged me to apply to medical school because he thought it might open doors and provide more opportunities. So I applied. I was delighted when I was accepted at Cornell. It was wonderful fatherly advice to a son.

CATALYST: Why did you come to NIH?

GALLIN: In medical school I was introduced to a visiting speaker—**Sheldon "Shelly" Wolff**, head of NIAID's Laboratory of Clinical Investigation; he later recruited me. He had this ability to recruit young people many of whom became really successful, like **Tony Fauci**. I once asked Shelly, "How do you do that?" He said, "I look for people who played on a team, either as an athlete or as

a musician, [someone] who had a sense of team activity." He said that was very important because in those days, during the Vietnam War, he could pretty much pick anybody—the cream of the crop of the medical schools. I think it was a good piece of advice. [*Gallin played ice hockey in high school and college and played clarinet in a band.*]

CATALYST: What's your research with chronic granulomatous disease (CGD)?
GALLIN: CGD is a rare genetic disorder in which the phagocytes cannot kill certain bacteria and fungi. Children with CGD are highly susceptible to frequent and sometimes life-threatening infections. These children lack a key enzyme for making reactive oxygen species [ROS], which is important in host defense against infection as well as in inflammation. ROS can cause all sorts of problems when not properly regulated ranging from atherosclerosis to cancer to traumatic brain injury. Sometimes patients with rare diseases serve as windows to common diseases.

When I came to NIH, I worked with others to define the biochemical basis of CGD. In collaboration with Genentech, Inc., we showed that the drug interferon gamma dramatically decreased the number of infections those children got by 70%.

The FDA licensed it very quickly. That was the first time I participated in a drug trial. FDA stipulated that we do a phase 4 study looking at long-term effects of this drug because it was given [as a subcutaneous injection] three days a week to patients. There were side effects—many patients felt like they had the flu. We needed a better treatment. Ultimately we used bone-marrow transplantation, then gene therapy. **Harry Malech**, who was working with me from the very beginning, led the effort.

Read a longer version of this interview online at https://irp.nih.gov/catalyst/31/2/interview-with-john-gallin-md

CATALYST: What's been the most satisfying part of your career?
GALLIN: It's the rewards of caring for patients in an environment where you could do research that could help them. We identified several different disorders of phagocytes. First just phenotypically, through their clinical manifestations of the disease and functional abnormalities of the cells, and then genetically. For some patients, we developed treatment strategies that clearly made a difference in the quality of their lives. Now, with the teams that we started, including people like Harry Malech and **Steve Holland**, bone marrow transplantation and gene therapy are being used to cure some of these patients.

I also enjoyed the environment of helping to participate in the management of the NIH Clinical Center—the largest single clinical research program in the world—watch it grow, and watch some new programs get started. So I had the good fortune of being in a position where things were changing.

CATALYST: What were some changes?
GALLIN: A number of departments flourished. I encouraged Clinical Center investigators to get dual appointments in the institutes and centers so they could get more resources. We brought the clinical research information system—CRIS—to the Clinical Center. Then we brought the biomedical translational research information system—BTRIS, which involves merging all hospital data with lab data and massaging it. Those were rewarding. Building the Department of Bioethics was something I enjoyed watching happen, too. I asked **Zeke Emanuel** [Ezekiel J. Emanuel], who was at Harvard at the time, if he would come and build a department. He asked me what he had to do. I said, "Just build the best bioethics department in the world." He liked that challenge. [Emanuel was Chief of the Clinical Center's Department of Bioethics from 1997 to 2011; **Christine Grady** succeeded him.]

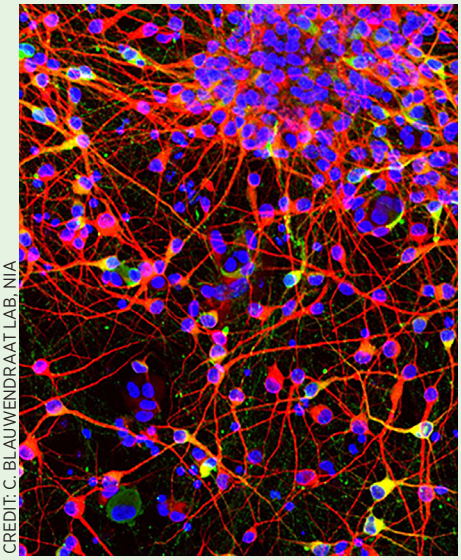
CATALYST: You started partnerships with outside organizations, too.
GALLIN: I started 10 partnerships and enjoyed that. One was with Howard University [a historically Black research university in Washington, D.C.] so students and faculty could conduct research with NIH PIs; NIH PIs could access the underrepresented minority patient populations at Howard.

CATALYST: You were also involved with the Children's Inn and the Safra Family Lodge.
GALLIN: I've always been privileged to be part of the Children's Inn, which was started in 1990 by **Phil Pizzo** [then Chief of the National Cancer Institute's Pediatrics Branch]. When I was on the Inn's board, I suggested—with input from the Clinical Center nurses—that we change the name to the Family Inn and that we get some resources and expand it to accommodate adults. The Children's Inn was happy with their brand and did not want to change. Fortunately the Foundation for NIH spearheaded fundraising efforts to build the Safra Family Lodge, which opened in 2005.

CATALYST: Tell me about the Trailblazer Prize.
GALLIN: Five years ago, my wife and I worked with the Foundation for NIH [FNIH] to create the annual FNIH Trailblazer Prize for Clinical Scientists, which recognizes the outstanding contributions of early career clinician-scientists. Institutions have nominated people; an FNIH jury reviews nominations. I'm pleased we could do that.

CATALYST: What's next for you?
GALLIN: I'll be spending time with my wife and family. I'll also be doing some educational activities and some research. ●

Intramural Research Briefs



CREDIT: C. BLAUWENDRAAT LAB, NIA

NIA, NINDS: NIA scientists helped create a detailed atlas for studying Parkinson's disease neurogenetic risk factors. Advanced genetic data was obtained from cultured dopamine neurons (pictured), the types of cells damaged by the disease.

NIA, NINDS: NEW NEUROGENETIC ATLAS TO HELP STUDY PARKINSON'S DISEASE

NIA and NINDS scientists made advanced genetic data obtained from 95 cell lines available online for researchers to study Parkinson's disease (PD) "and ultimately spur development of new treatments," said study author and NIA Stadtman Investigator **Cornelis Blauwendraat**.

The investigators created the atlas as part of the Foundational Data Initiative in PD (FOUNDIN-PD), a joint project among NIH scientists and research centers in Arizona, California, and Germany. The data were obtained from dopamine neurons, the type of brain cells typically damaged by PD. These cells were derived from donated human cells that had been reprogrammed (induced) into pluripotent stem cells and then grown into neurons. Many of the donors were diagnosed with PD or carried a gene variant associated with the disease.

The cells were donated by volunteers in the Parkinson's Progression Markers Initiative (PPMI) and scientists can browse atlas data at the FOUNDIN-PD website or download them along with other relevant data, such as brain scans and blood tests, from the PPMI website: http://www.ppmi-info.org. (NIH authors: X. Reed, F.P. Green, A. Bielina, K.J. Billingsley, J. Berghausen, V. Pitz, D. Patel, K. Daida, Y. Li, D.G. Hernandez, M. Nalls, J.R. Gibbs, M.R. Cookson, A.B. Singleton, and C. Blauwendraat, *Cell Genomics* **3**:100261, 2023)

[BY CHRISTOPHER THOMAS, NIA]

NHLBI, NIMHD: HEART FAILURE RISK SIGNIFICANTLY HIGHER IN RURAL AREAS

Adults who live in rural areas of the United States were 19% more likely to develop heart failure (HF) than those living in urban areas, according to a recent study by scientists at NHLBI, NIMHD, and their colleagues at Vanderbilt University Medical Center (Nashville, Tennessee).

Controlling for variables such as smoking and cardiovascular risk factors, the investigators found that the most vulnerable group of rural Americans were Black men, with a 34% higher risk of HF than their urban counterparts. White women had the second highest risk of HF at 22%, which was higher than Black women. For white men, rural living did not correlate with a higher HF risk.

The research team analyzed data from The Southern Community Cohort Study, which enrolled 27,115 adults from 12 states located in the southeastern United States. NHLBI Senior Investigator **Véronique Roger** noted that heart failure can be prevented by following a heart-healthy lifestyle and that one of the biggest contributors to heart failure is high blood pressure, which Black men experience at disproportionately high levels. (NIH authors: S.E. Turecamo, T.M. Powell-Wiley, J. Joo, and V.L. Roger, *JAMA Cardiol* 2023; DOI:10.1001/jamacardio.2022.5211)

[BY HYUN CHUNG, NCI]

NICHD, NCI: SCIENTISTS DISCOVER NEW MECHANISM OF GENE REGULATION DURING EARLY DEVELOPMENT

In a growing embryo, the mechanisms by which genes turn on or off to ensure a healthy pregnancy are not completely understood. A recent study by NICHD and NCI investigators revealed insights into the protein CTCF, which is known to play a role in blocking gene expression, and provide new clues about the early stages of mammalian development.

One way that cells regulate gene expression is through noncoding strands of DNA known as enhancers that seek out their specific target promotors—a region of DNA where gene transcription can either be initiated or blocked from occurring. Formation of DNA loops by CTCF has traditionally been proposed to block enhancers from interacting with unspecific promoters.

The scientists used mutant mouse models to study how CTCF loops can interfere with expression of the *Sox2* gene, which is essential for the accurate embryonic development of many cell types. By inserting CTCF loops between *Sox2* and its enhancers, the authors were surprised to find that in some tissues, such as epiblast and neural, CTCF did not repress *Sox2* from being activated. However, in other tissues such as the gut, the same CTCF loops completely blocked the enhancers from *Sox2*, resulting in malformation of the trachea and esophagus. According to the authors, further research is needed to understand why some enhancers are more susceptible than others to regulation by CTCF loops. (NIH authors: S. Chakraborty, N. Kopitchinski, Z. Zuo, A. Eraso, P. Awasthi, R. Chari, A. Mitra, R.K. Dale, T.J. Petros, and P.P. Rocha, *Nat Genet* **55**:280-290, 2023)

[BY MICHAEL TABASKO, OD]

NEI, NCATS, NHLBI: RESEARCHERS CREATE EYE TISSUE USING 3D BIOPRINTING

Using 3D bioprinting, tissue engineering, and induced pluripotent stem cells, NIH researchers constructed human eye tissue and used it as a new model for studying age-related macular degeneration (AMD), a leading cause of blindness.

AMD begins in the outer blood-retina barrier (oBRB), which is composed of tissue layers that

provide critical support to the retina's light-sensing photoreceptors. The new 3D bioprinted eye tissue mimics the structure and function of the oBRB, including a capillary bed.

When the scientists stressed the tissue, they found that it accurately modeled two types of AMD, and found that drugs used to treat AMD restored the tissue's health.

The team has now added other cell types to their model, such as immune cells, to even more accurately reconstruct natural eye tissue; and they have built patient-specific tissues using an individual's own stem cells. This work opens possibilities of stratifying drug trials for specific patient groups and developing patient-specific tissue transplants. (NIH authors: M.J. Song, R. Quinn, et al., *Nat Methods* **20**:149–161, 2022)

[BY HIKARI TANAKA, NIA]

NIAID: PROBIOTIC TREATMENT REDUCES COLONIZATION OF HARMFUL BACTERIA

Staphylococcus aureus (*S. aureus*), a bacterium that often lives in and on the human body without causing any harm, can sometimes cause serious or fatal infections. Some strains such as methicillin-resistant *S. aureus* (MRSA) are antibiotic resistant. A new study shows how the use of probiotics—live microorganisms associated with several health benefits—could be an effective preventative strategy.

NIAID researchers and their colleagues assessed how well the probiotic *Bacillus subtilis* reduced the ability of *S. aureus* to colonize the human gut and nose. They enrolled 115 healthy adults who were naturally colonized with *S. aureus* in their intestine and nose and were given a probiotic treatment or a placebo once daily for 30 days. The probiotic led to a 97% reduction of *S. aureus* in the stool, which reflected intestinal colonization, and a 65% reduction in the nose, compared with no change in the placebo group. Probiotic administration did not alter the intestinal microbiome, which is a common adverse side effect of using antibiotics and antiseptics.

The research team plans to test the probiotic in trials to see whether the approach can be used to prevent infection. (NIH authors: P. Piewngam and M. Otto, *Lancet Microbe* **4**:E75-E83, 2023)

[BY ELISA GUMA, NIMH]

NHGRI, NIAID: GENOTYPE-FIRST APPROACH UNCOVERS NEW LINKS TO GENETIC CONDITIONS

NHGRI researchers and their collaborators described three types of discoveries made by analyzing 13 NIH studies with a new approach called reverse phenotyping. In this approach, the phenotype is determined from the analysis of individuals with specific genomic variants, and then evaluating their physical characteristics.

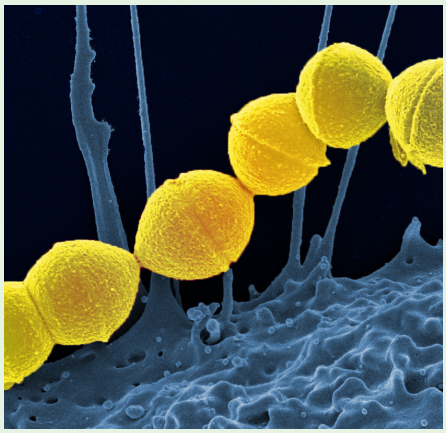
In one study the investigators identified new links between the *TPSAB1* gene and symptoms affecting the gastrointestinal tract, connective tissue, and nervous system; another study uncovered previously unknown symptoms related to a known genomic variant associated with a metabolic disorder; and a third study found that a genomic variant was associated with immune system dysfunction, potentially helping clinicians understand newly described disorders.

NIH intramural researchers now have access to the data through the Reverse Phenotyping Core Genomic Data Browser database to help identify genomic variants of interest in their own work.

This new technology has the potential to help physicians diagnose conditions that are latent and potentially beneath the surface. (NIH authors: C.M. Wilczewski, J. Obasohan, J.E. Paschall, S. Zhang, S. Singh, M. Similuk, T.G. Wolfsberg, C. Turner, L.G. Biesecker, and A.E. Katz, *AJHG* **110**:3-12, 2023)

[BY STEPHEN ANDREWS, NCI]

Read longer versions of these briefs, including photos, at https://irp.nih.gov/catalyst/31/2/research-briefs.



CREDIT: NIAID

NIAID: Methicillin-resistant *S. aureus* (yellow) being ingested by neutrophil (purplish blue).

NIAID: FIRST-IN-HUMAN STUDY EVALUATES MARBURG VIRUS VACCINE

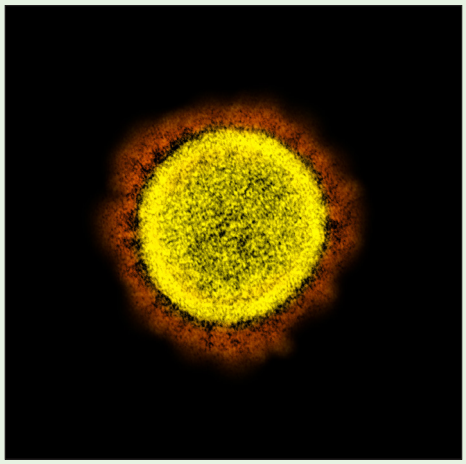
Marburg virus (MARV), like Ebola virus, causes severe hemorrhagic fever and can be lethal in up to 90% of those infected. And new outbreaks are occurring: Ghana reported its first cases in 2022, and as recently as February 2023, Equatorial Guinea confirmed its first-ever outbreak of MARV. There are currently no FDA-approved vaccines to prevent the disease. In a first-in-human trial, an experimental vaccine developed by NIAID scientists at the Vaccine Research Center was found to be safe, well-tolerated, and effective.

Known as cAd3-Marburg, the vaccine uses an inactivated virus that displays a glycoprotein found on the surface of MARV to elicit an immune response.

The study enrolled 40 healthy adults at the Walter Reed Army Institute of Research Clinical Trials Center (Silver Spring, Maryland) who received either a high or a low vaccine dose. After four weeks a single dose of the vaccine elicited a robust antibody response in 95% of all participants. That response remained durable in 70% of participants after 48 weeks. Further trials are planned to test cAd3-Marburg in Ghana, Kenya, Uganda, and the United States. (NIH authors: K.V. Houser, A.R. Hofstetter, et al., *Lancet* **401**:294-302, 2023)

[BY DIANNE LEE, NIMH]

COVID-19 Timeline at NIH (January–February 2023)



CREDIT: NIAID

Transmission electron micrograph of SARS-CoV-2 virus particles, isolated from a patient and color-enhanced.

January 3: An NIH-supported study of children and adolescents who received a COVID-19 vaccination after multisystem inflammatory syndrome finds that there were no reports of serious complications.

January 4: A NIAID-led study finds that males who recovered from mild COVID-19 mounted a stronger immune response to the flu vaccine compared with those never exposed to SARS-CoV-2. The findings suggest that SARS-CoV-2 infection can alter future immune responses.

January 5: NIH launches the Home Test to Treat program in partnership with health departments.

January 6: CDC's updated COVID-19 community levels: Framingham, Massachusetts, and Research Triangle Park in North Carolina, move from medium to high; Rocky Mountain Labs in Montana, moves from medium to low; all other NIH locations remain at medium.

January 9: NIH awards eight grants to refine new technologies for early diagnosis of severe illnesses resulting from SARS-CoV-2 in children.

January 11: NIAID researchers author a perspective on next-generation vaccines for respiratory viruses such as SARS-CoV-2, influenza, and respiratory syncytial virus.

January 13: CDC's updated COVID-19 community levels: Frederick, Maryland, moves from low to medium; Phoenix moves from medium to low; Framingham, Massachusetts, moves from high to medium; other NIH locations remain same.

January 13: In an all-staff email, **Lawrence Tabak** (Performing the Duties of the NIH Director) reports that new COVID-19 cases and hospitalizations continue to increase nationally due to colder weather, indoor gatherings, and the circulating XBB.1.5 omicron subvariant.

January 20: CDC's updated COVID-19 community levels: Frederick, Maryland, moves from medium to low; Research Triangle Park in North Carolina, moves from high to medium; all other NIH locations remain at their current levels.

January 26: The FDA announces that the monoclonal antibody Evusheld is no longer authorized for use in the United States.

January 26: An FDA advisory panel votes to offer one type of COVID-19 shot for both the primary and booster doses and agrees to shift to annual, fall COVID-19 boosters for most people.

January 27: CDC's updated COVID-19 community levels: NIH main campus in Montgomery County, Maryland, and Detroit, Michigan, move from medium to low; other NIH locations remain same.

January 30: The Biden Administration announces that it plans to end the COVID-19 national and public health emergencies on May 11, 2023.

January 31: The NIH Clinical Center announces that staff no longer needs to make advance arrangements for visitors.

February 2: NIH leaders and partner organizations outline NIH's COVID-19 research response in *Science*. The authors reflect on crucial lessons learned that will inform the public health research response to future pandemics.

February 8: **Lawrence Tabak** testifies along with the CDC Director and FDA Commissioner at the House Energy and Commerce Committee hearing on the federal response to COVID-19.

February 9: The Biden administration rolls out a roadmap on how ending the COVID-19 public health emergency on May 11 will affect the U.S.

February 10: **Lawrence Tabak** emails staff with a Coronavirus Update detailing pandemic response wind-down efforts. This week he ended the regularly scheduled meetings of the COVID-19 Response and Recovery Team. On March 8, the NIH Office of Communications and Public Liaison will sunset the NIH Guidance for Staff on Coronavirus intranet page. Tabak's email will be the last regularly scheduled all-staff email about pandemic response at NIH.

February 10: Updated COVID-19 community levels: Baltimore moves from medium to low; all other NIH locations remain at their current levels.

February 14: NIH-supported study reports that half of adults treated at hospitals for COVID-19 have experienced lingering symptoms, financial difficulties, or physical limitations months later.

February 15: NIH initiates a multisite clinical trial evaluating an investigational antiviral (ensitrelvir fumaric acid) for the treatment of COVID-19.

February 16: Two NIH-funded studies find that Black and Hispanic Americans appear to experience more symptoms and health problems related to long COVID than white people.

February 17: CDC's updated COVID-19 community levels: Rocky Mountain Labs moves from low to medium community level; all other NIH locations remain at their current levels.

February 17: The NIH Clinical Center stops issuing stickers to visitors screened for COVID-19.

February 24: CDC's updated COVID-19 community levels: Research Triangle Park in North Carolina, and Framingham, Massachusetts, move from medium to low; NIDDK in Phoenix from low to medium; all other NIH locations remain same.

February 24: Moderna honors its December 2022 agreement to compensate the NIH for developing a chemical technique used in Moderna's development of its COVID-19 vaccine.

February 26: A United States Department of Energy report concludes with "low confidence" that it is plausible the COVID-19 pandemic originated from a laboratory leak in China.

February 27: National Security Council spokesperson John Kirby tells reporters at a White House Press Briefing that the U.S. government still has not reached a consensus on how the coronavirus pandemic started. ●

Read more details, complete with links, at https://irp.nih.gov/catalyst/31/2/covid-19-timeline-at-nih-january-february-2023.

Technology Transfer

How to Disclose and Protect your Research Discovery or Innovation at NIH

BY LARISA GEARHART-SERNA, NCI

So, you have a research discovery or innovation at NIH—now what? Federal researchers are legally required to disclose their discoveries and inventions. NIH technology transfer (TT) professionals across multiple TT offices that serve different institutes and centers assess whether those discoveries are eligible for research partnerships, patenting, or other agreements. You may be wondering: Where do I go first? How and when do I report new discoveries? What will happen to my inventions? Follow the four steps below to stay engaged with your TT community at NIH and move your research forward—and turn discovery into health.

Step 1: Contact TT support before you publicly disclose

As an NIH scientist, it is important to know that publicly disclosing anything about your research invention can make it unpatentable in certain countries. For example, when the United States Patent and Trademark Office reviews a patent application, any prior public disclosures could cause a rejection because the invention was previously known and could therefore be anticipated. Public disclosures include conference or workshop presentations and posters, abstracts, manuscripts, and even conversations with those outside of NIH. Prior to any potential public disclosure, discuss your unpublished research with a TT professional. For guidance on whom to speak with, visit the contacts page on the NIH Office of Technology Transfer website.

Step 2: Submit an invention report

If you think you made a new research discovery or innovation—potentially an invention—fill out an Employee Invention Report (EIR) as soon as possible and send it to your TT professional. Patent protection may be needed to give the TT office a better chance at finding and incentivizing commercial partners that can develop your invention. Additionally, if a company requests older biological material from your lab, those requests should be reported to the TT office; you will also need an EIR. Biological material licenses are the most common type of license agreement, and the reagents or biological materials created by the lab for the next set of experiments are the most likely inventions to be made. The EIR will ask for information regarding any co-inventors, subject matter, potential uses, and other details to determine the patentability and feasibility of your invention.

Step 3: Participate in collaborations

CDAs, MTAs, and CRADAs, oh my! When you need to send or receive materials or data, talk about your invention, or collaborate on any project, big or small, different types of contractual TT agreements come into play. You might remember the different types of research and collaboration agreements from your mandatory TT training when you first joined NIH. These include Confidential Disclosure Agreements (CDAs), Data Transfer Agreements (DTAs), Material Transfer Agreements (MTAs), Research Collaboration Agreements or Collaboration Agreements (RCAs or CAs), Clinical Trial Agreements (CTAs), and Cooperative Research and Development Agreements (CRADAs). Refer to the NIH resources page for links to both the TT training and helpful FAQs. Your TT professionals will know which mechanism to use based on your needs and circumstances—including funding for your research project—so always consult them first.

Step 4: Make an impact

Many people do not realize how many innovations and technological advances originated in federal laboratories and ultimately reached the marketplace in large part through federal TT efforts. For example, the Federal Laboratory Consortium's Lab Tech in Your Life website explores dozens of federally developed commercial technologies present in airport and home settings, highlighting that federal TT is in fact all around us. Many of the products invented here at NIH are research tools, methods, or constructs strictly for research purposes, while others will lead to new therapies, diagnostics, vaccines, devices, software, and more. For NIH, TT brings new collaborative expertise and partnerships that enhance our research capacity and impact and add research resources. For NIH researchers, license royalties are shared and can have a substantial financial impact. Most importantly, the technologies developed at NIH, and subsequently transferred, benefit public health—core to NIH's mission. ●

Larisa Gearhart-Serna, a Postdoctoral Fellow in the National Cancer Institute's Technology Transfer Center, is a member of The NIH Catalyst *Editorial Board.*

Resources

NIH Office of Technology Transfer:
https://www.techtransfer.nih.gov/

NIH Inventor Resources:
https://www.techtransfer.nih.gov/inventors

NIH Products:
https://www.techtransfer.nih.gov/reportsstats/hhs-license-based-vaccines-therapeutics

Inventor Showcase: https://www.techtransfer.nih.gov/inventors/showcase

Gecko

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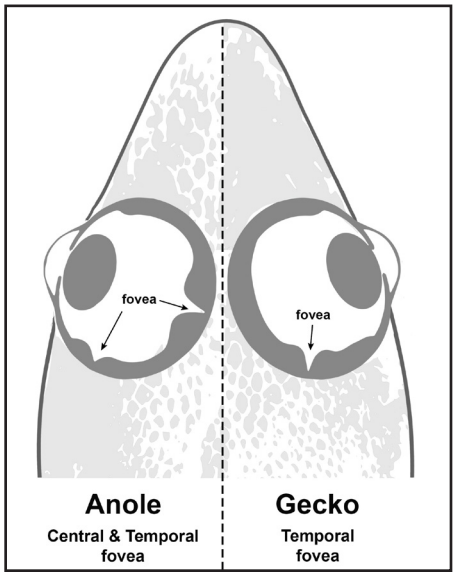

CREDIT: ASHLEY RASYS, NEI

A thin part of the retina called the fovea helps humans have high-acuity central vision. The eyes of the anole lizard and the gecko have fovea, just like us.

thinks that lizards like the gecko (*Gonatodes antillensis*, *Phelsuma lineata*, *Lygodactylus kimhowelli*) can serve as a useful model to understand what's happening in the eyes of his patients.

Hufnagel works with people who have rare genetic conditions that affect their vision. For these patients, few other people around the world have a similar disease, and in many cases, no animal models for their disease exists. This makes finding and testing treatments for their disease a challenge.

"For rare diseases in humans, it can be really difficult to find enough patients with similar clinical diseases and genetic changes to translate those diseases to genotype:phenotype studies in an animal model. Being able to create relevant animal models to help study these rare diseases is important to our patients," said Hufnagel. Genotype:phenotype studies reveal how individual sections of DNA physically manifest in the body.

Although he also works with mice (*Mus musculus*) and zebrafish (*Danio rerio*), Hufnagel has chosen the gecko—along with a close lizard relative, the anole (*Anolis sagrei*)—as his newest animal model. One of the reasons he chose the gecko is that the animal's eyes have features that nicely mimic the human eye. Many of the most common mammalian animal models, like mice or rats, have what's known as rod-dominant eyes, meaning they see mostly in black and white. They also tend to lack a thin part of the retina called the fovea, which helps humans have high-acuity central vision. The gecko, on the other hand, has a fovea, just like us.

"The geckos and anoles each bring their own attributes—there are advantages and limitations to working with each of these animals," said **Ashley Rasys**, a postdoctoral fellow in Hufnagel's lab.

The anoles, for instance, reproduce much more quickly and easily than the geckos. But the geckos, with their single fovea (compared with two foveas in the anole eye) are more similar to humans.

"By comparing both, we'll be able to learn a lot about how the fovea develops and how mutations affecting certain genes can lead to foveal defects," said Rasys. "There are a lot of similarities between the gecko's eye structure and ours—it shows a very similar pattern of development to the human as well. Right now, we're doing developmental staging on the gecko's eye, and testing tools for genetic reprogramming."

Hufnagel's plan hinges on the CRISPR technology. This technique allows researchers to simply and quickly mutate a particular gene in an animal. Hufnagel plans to use this technique to match geckos to the genetic changes present in his patients. Then he can test novel treatments and therapies in the geckos, with a pretty good idea of what to expect from his patients.

Prior to coming to the NIH, Rasys developed and used the CRISPR technique to knock out the *tyrosinase* gene in the anole (*Cell Rep* **9:**2288-2292, 2019). Loss of the gene leads to oculocutaneous albinism (OCA) in humans and other animals. In humans, OCA leads not only to reduced melanin pigment in the skin and eye, but also to developmental defects in the fovea that can cause low vision. "By knocking out *tyrosinase* and other genes in the lizard, we can evaluate an animal with abnormal development or degeneration of the fovea that resembles the human disease," Hufnagel said.

By studying this disease in a species like the gecko, with eyes similar to human eyes, Hufnagel will be able to better understand what pathways are involved in foveal development.

"Not only do new tools like genome editing and genome assembly allow us to do these kinds of manipulations..., it accelerates our ability to choose an animal model based on the features of the organism, rather than the [models] that are already available. It gives us new ways to understand the particulars of certain diseases," Hufnagel said. "As we see patients in clinic and find new genetic diseases, depending on the features we observe in the patient, we can pick the right [model] to study their disease." ●

Lesley Earl is a science writer and Section 508 coordinator in the Office of Science Communications, Public Liaison, and Education at the National Eye Institute.

To connect with NIH researchers working with different types of animal models, consider joining the Interspecific Modeling Scientific Interest Group (https://oir.nih.gov/sigs/interspecific-modeling-interest-group).

Read about NIH-funded extramural researchers who are using fruit flies, newts, and zebrafish in their vision research at https://www.nei.nih.gov/about/news-and-events/news/small-creatures-teach-big-lessons.

The Faucet of Youth

Scientists Explore Links Between Hydration and Aging

BY MICHAEL TABASKO, OD

Legend has it that Spanish conquistador Juan Ponce de León scoured the Caribbean and Florida for the fabled fountain of youth. He never found it. In a twist of fate, he died prematurely from wounds sustained during a skirmish with native warriors. Could an antiaging elixir exist today? Perhaps look no further than a glass of water.

Being well hydrated is associated with a range of health benefits including a lower risk of developing chronic diseases and a higher chance of living longer than in those who may not get sufficient fluids, according to a recent study by researchers at the National Heart, Lung, and Blood Institute (NHLBI) (*eBioMedicine* **87:**104404, 2023).

In addition to supporting essential body functions, previous NHLBI research has suggested that consuming enough fluids throughout life may also reduce the risk of severe heart problems (*Eur Heart J* **43:**3335-3348, 2022). And well-controlled mouse studies (also conducted by NHLBI researchers) have shown that lifelong water restriction increased serum sodium concentrations and shortened the mouse lifespan by six months—equivalent to about 15 human years (*JCI Insight* **4:**e130949, 2019). Those chronically hypohydrated mice also developed degenerative changes in multiple organ systems much faster than control mice.

Could insufficient fluid intake speed up our own aging clock? The NHLBI team used serum sodium concentration as an indicator of hydration status to find out whether poor hydration in middle age might also be associated with accelerated aging. Not drinking enough fluids is the most common cause of elevated serum sodium and, as it turns out, might also lead to poor health.

"We found that adults with serum sodium concentrations greater than 142 millimoles per liter [mmol/L] had a higher risk of accelerated aging and were more likely to die at an earlier age," said lead investigator **Natalia Dmitrieva**, adding that physicians could use this threshold to further evaluate patients and advise them on better hydration habits. That newly identified sodium threshold is well within the normal range of 135-146 mmol/L and would not typically be flagged during a routine blood test (*Eur Heart J* **43:**4438-4439, 2022).

The researchers analyzed health data from 11,255 people gathered during five medical visits over a 30-year period as part of NHLBI's ongoing Atherosclerosis Risk in Communities (ARIC) study. That study began enrolling middle-aged adults in 1987 from four United States communities and has followed them for over 25 years. The first two medical check-ups were performed three years apart when participants were in their 50s, and the last when they were between ages 70 and 90. People whose serum sodium was outside the normal range at the initial visits and those with certain preexisting conditions were excluded from the analysis.

As we age, health markers such as blood pressure and cholesterol usually increase. When those markers rise rapidly a person becomes biologically older than their actual age. People whose health metrics change slower are considered biologically younger. Using 15 health markers, the NHLBI team assessed the biological age of ARIC study participants at middle age and then evaluated how serum sodium correlated with the biological age. "When I pushed the button and plotted all [the data] it was really surprising to see that participants with higher sodium were biologically older than their actual age," said Dmitrieva.

CREDIT: MICHAEL TABASKO, OD

Individuals who were biologically older than their actual age at baseline had an approximately 30% higher risk of dying younger and were about 35% more likely to develop chronic diseases such as heart failure, dementia, chronic lung disease, and stroke compared with the biologically younger participants. And salty serum did indeed have predictive value. The odds of being biologically older than one's chronological age were increased by 10–15% for serum sodium exceeding 142 mmol/L. Those odds jumped to approximately 50% for concentrations exceeding 144 mmol/L compared with participants with serum sodium below 142 mmol/L.

Future studies could look at the mechanisms of how hydration directly

CONTINUED ON PAGE 23

NINR's New Scientific Director: Sabrina Wong, R.N., Ph.D.

Primary Care Leader to Improve Accessibility and Inclusivity

BY SATABDI NANDI, NIA

CREDIT: ANDREW LIANG, NINR

Sabrina Wong became the new Scientific Director for the National Institute of Nursing Research in September.

The National Institute of Nursing Research (NINR) welcomed **Sabrina Wong** as its new Scientific Director (SD) in September 2022. A scholar and international leader in primary-care research, she brings her passion for reducing inequities in health and health care and a long-standing interest in the organization and delivery of primary health care services. Before coming to NIH, Wong was the Associate Director of Research at the University of British Columbia (UBC) School of Nursing, in Vancouver, British Columbia, Canada.

Wong and her parents—who are of Chinese descent but were born and raised in Canada—consider themselves Canadian. But growing up, Wong witnessed the discrimination faced by Asian Canadian and immigrant families. She recalls that her parents had to face overt and structural racism and discrimination while dedicating themselves to providing a better life for their children.

Wanting to make a difference in addressing the inequities she experienced, Wong gravitated towards the nursing profession after having been inspired at a young age by two of her aunts, who were nurses. "I greatly admired what they did," she said.

After receiving her bachelor's in nursing from the UBC, Wong went on to earn a Ph.D. in nursing and a master's in community health nursing administration from the University of California at San Francisco. Today, Wong's peers widely recognize her as an expert in her field. She is a Fellow of the American Academy of Nursing and a Fellow of the Canadian Academy of Health Sciences.

Wong's work at UBC focused on researching the primary-care system and models of care to identify interventions that may improve human health and health care outcomes. Her work also focuses on incorporating patients' voices as outcomes of care. She noted that this is particularly important for people who are the most vulnerable, such as those experiencing multiple intersecting social determinants of health, "where people don't have access to health care, are precariously housed, and face systemic inequities due to lack of transportation and discrimination."

Wong also played a central role in creating Canada's first multidisease electronic medical record surveillance system. Clinicians, researchers, and policymakers can now use these data to better understand primary care efficiencies and identify gaps to improve health care for Canadians.

NIH's reputation as the world's largest public funder of biomedical research attracted Wong from academia because she saw the potential to help make a difference on a global scale. "There are world-class scientists and resources that generate discoveries here at NIH [that] can complement those realized through working at an academic institution," she said.

Her first few months as the NINR SD have been busy ones, to be sure. Wong and her colleagues are working on a brand-new strategic plan to guide NINR's Division of Intramural Research. The new plan aims to ensure that all team members have an equal opportunity to achieve their professional goals unhindered by traditional hierarchies. Wong hopes that the new strategies and directions in a plan built together will result in a diverse, inclusive, and productive research environment at NINR. Looking ahead, Wong wants to see intramural research at NINR make advances in primary care more accessible across a diverse range of communities and populations.

When she's not working, reading, or authoring scientific papers, Wong enjoys the great outdoors and has a talent for running long—really long—distances. In South Africa, she completed Comrades, the world's oldest ultramarathon, where she ran 60 miles in less than 11 hours, days after summitting Mt. Kilimanjaro in Tanzania. She's also finished the 120-mile Trans-Rockies ultramarathon in Colorado, a six-day adventure that covers elevations between 7,400 and 12,600 feet above sea level between Buena Vista and Beaver Creek. These days, she tries to fit exercise into her daily routine, "like running to the Metro station on the way to work," she said. ●

Satabdi Nandi, a Postdoctoral Fellow in the National Institute on Aging, is investigating the generation of antibody diversity in mouse B cells.

New Director for NIH Library

Nancy Muir Will Oversee the Virtual and Physical Library

BY NIH LIBRARY STAFF

CREDIT: MARLEEN VAN DEN NESTE

Nancy Muir became the NIH Library Director in January.

The NIH Office of Research Services in January named **Nancy Muir** as the NIH Library Director. Muir, who joined the NIH in January 2021 as the NIH Library Branch Chief for Educational Services, brings a strong history of innovation and leadership to her new role as Director. In prior positions over her 25-year career as a librarian, she built and led MedImmune's virtual library for AstraZeneca's biotech unit and developed the Food and Drug Administration's library training program.

Located in Building 10, the NIH Library serves the NIH community and colleagues across the Department of Health and Human Services with specialized research services and resources including bibliometrics, data services, editing, literature searches, systematic reviews, translations, and more. Nearly all NIH journal subscriptions are paid through the NIH Library.

Muir said she hopes to deliver new information solutions in the physical and virtual NIH Library to help staff make biomedical discoveries and improve health. To enhance NIH Library services, she said she will have her team focus on improving support for NIH researchers at every stage of the research cycle and their careers.

Muir's plans include:

• Enhancing the library's 3D printing service with a new printer, which will expand printing capacity and streamline the process, making it faster and easier for NIH staff to create 3D prints of laboratory equipment, anatomical and molecular structure models, prototypes, and more;

• Providing a new dedicated space for creating video and audio products, such as podcasts or video abstracts for publications;

• Expanding several of the Library's core research services, including the Systematic Review and Data Service programs;

• Extending the NIH Library Training Program to include asynchronous classes, and;

• Increasing scholarly communication services to support researchers with every step of the publishing process.

Muir said she believes strongly in connecting directly with the community to understand how to meet their needs through their existing daily workflows. She also is an advocate of adopting new technologies and processes to enhance information services. ●

If you have ideas or suggestions for the NIH Library or would like to meet the new director, contact Muir at nancy.muir@nih.gov or 301-451-9335.

NIH ABBREVIATIONS

CBER: Center for Biologics Evaluation and Research, FDA
CC: NIH Clinical Center
CCR: Center for Cancer Research, NCI
CIT: Center for Information Technology
DCEG: Division of Cancer Epidemiology and Genetics, NCI
DIPHR: Division of Intramural Population Health Research, NICHD
FAES: Foundation for Advanced Education in the Sciences
FARE: Fellows Award for Research Excellence
FelCom: Fellows Committee
FDA: Food and Drug Administration
FNIH: Foundation for the NIH
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

Our Shared Ancestry in African Genomes Can Be Harnessed to Improve Health For All

Ambroise Wonkam's WALS Lecture

BY SREYA SANYAL, NIDCR

CREDIT: JOHNS HOPKINS MEDICINE

Ambroise Wonkam, M.D., Ph.D.

"Less than 2% of human genomes analyzed so far have been those of African people, despite the fact that Africa, where humans originated, contains more genetic diversity than any other continent," medical geneticist Ambroise Wonkam wrote in a *Nature* commentary (*Nature* **590:**209-211, 2021). He explained further at a Wednesday Afternoon Lecture last September that "to make genetic medicine truly equitable, we need to have representation of a wide genome [by starting] with our common ancestral genomes—genomes of the population of African ancestry."

Wonkam, who is a Professor of Genetic Medicine and Director of the McKusick-Nathans Institute and Department of Genetic Medicine at Johns Hopkins Medicine (Baltimore), is investigating the genetics of people from Africa to obtain a more thorough understanding of the genetic origins of diseases and other health conditions. The African genomes hold many secrets: There's about 10% more DNA than in the human reference genome built from the Human Genome Project (*Nature Genetics* **51:**30-35, 2019).

By gathering more information from African genomes, scientists can identify genes and variants that haven't been found in previous studies, most of which are based on people of European descent. Wonkam and **Charles Rotimi**, the Scientific Director in the National Human Genome Research Institute, have collaborated on the Human Heredity and Health in Africa (H3Africa) consortium, which is partially funded by NIH and facilitates projects led by African scientists. Projects have included population-based genomic studies of heart and renal disease and tuberculosis, and have identified three-million previously unidentified variants (*Nature* **592:**E26, 2021).

Because most participants in genome-wide association studies are of European descent (they make up only 16% of the world's population), genetic risk factors for certain diseases and conditions are more accurate for that population. But results from African genome studies are revealing information that may be beneficial for larger populations.

For example, up to 2% of African genomes contain mutations in the *PCSK9* gene, which are related to lower cholesterol levels. The finding and has led to the development of cholesterol-lowering medications. And Huntington's disease is associated with at least two genes in African patients versus only one gene in patients with European ancestry. Understanding why such mutations are differentially prevalent in African and diverse populations can provide insights into better diagnosis and care for sickle-cell disease, heart disease, high cholesterol, Huntington's, and many other diseases and conditions.

Implications

In an interview with *The NIH Catalyst*, Charles Rotimi discussed how the American landscape is shaped by African genomics. Rotimi, who is also the Director of the trans-NIH Center for Research on Genomics and Global Health, uses data from African American study participants as controls to explore the evolutionary contexts of diseases.

Using genetic sequencing, Rotimi and his group found that African Americans who have higher concentrations of triglycerides in their blood are likely to have higher proportions of European ancestry in genes associated with triglycerides. Rotimi's work is crucial to developing a better understanding of how the complex ancestral backgrounds of African Americans compared with West Africans and Europeans can inform health disparities here in the United States. Rotimi and Wonkam are both interested in epigenetic changes to the genome. Their work suggests that studying African genomics can further our understanding of modern medicine.

"African genomic variation is the next frontier of global genetic medicine," Wonkam proclaimed during his talk. ●

To watch a videocast of the lecture, held on September 14, 2022, go to https://videocast.nih.gov/watch=45982.

Sreya Sanyal is a Postbaccalaureate Fellow in the National Institute of Dental and Craniofacial Research's Proteases and Tissue Remodeling Section. She is studying the modification of anthrax toxin variants for use as a potential therapy for cancer.

WALS: Cooper

CONTINUED FROM PAGE 1

on January 11, 2023, titled "Forging a New Future: Inclusion of People with Disabilities in Technology Research and Development."

In his lecture, Cooper described a multitude of projects and approaches at HERL that incorporate firsthand experiences or empathy in the search for solutions to mobility and other obstacles to health care. Approximately 20% of the HERL team has some form of impairment, and many others have a close family member with an impairment. They are drawn to HERL because of a passion for the mission.

HERL's success can be measured in numerous ways: hundreds of peer-reviewed papers; more than 25 patents; dozens of students with disabilities graduating to rewarding careers and leadership positions; and, most poignantly, the shrieks of delight from a child with the newfound independence and confidence to play in a waterpark for the first time in the safety of a wheelchair powered not by batteries but rather pneumatics.

An unplanned path, of sorts

A wheelchair was not in the plan when Cooper enlisted in the Army at age 17. Yet what would follow makes sense. He had an innate passion to serve others and to compete fiercely. He was an athlete before his spinal-cord injury, and he would maintain that drive afterward. In various competitions, including the Paralympic Games, he has earned more than 200 medals in handcycle racing, swimming, and table tennis.

He was attracted to engineering at an early age. After his military service, Cooper returned to his home state to attend California Polytechnic State University (Cal Poly) in San Luis Obispo, California, where he earned a B.S. degree in electrical engineering, followed by an M.S. degree in electrical engineering. He then received a Ph.D. degree in electrical and computer engineering with a concentration in bioengineering from the University of California at Santa Barbara (UCSB).

And so, it all came together.

"I learned of and became interested in the bigger picture very quickly, literally within a year of starting college through learning of the challenges facing other adaptive sports athletes and other students on campus," Cooper told *The NIH Catalyst*. "Soon I was introduced to the disability rights advocacy community and quickly learned of the complexity and magnitude of the challenges."

Among Cooper's first engineering accomplishments was making wheelchairs that helped him get in and out of his car more easily or to race faster. His Ph.D. advisor helped him see the broader potential.

"'You're a brilliant engineer; you understand people with disabilities' needs; and they need you,'" Cooper relayed about what his advisor, Steven Horvath, had told him. "'And if you don't go into this field, why should anybody else? You can make a real difference if you do this.'"

California proved to be relatively accommodating for the disabled, providing a grounding on which Cooper could launch his career. He had completed all his college degrees before the passage of the Americans with Disabilities Act of 1990. But California was ahead of many states in accessibility as it relates to narrow aisles, high lab benches, and stairs with no practical alternative, Cooper said.

Cooper added that he was fortunate that students, faculty, and staff at both Cal Poly and UCSB were supportive and open to listening and working collaboratively. The biggest attitude barriers he faced came from outside his local community, in areas such as establishing credit, renting a car, flying on a plane, and staying in a hotel. These attitudes linger, he said.

Rory Cooper, Ph.D.

Forging a new future

In his WALS lecture, Cooper said that he sees great potential in collaborating with the NIH. He already has extensive collaborative ties to Walter Reed National Military Medical Center (Bethesda, Maryland), where he works with disabled veterans.

For his visit to the NIH, Cooper was accompanied by his wife, Rosemarie, a physical therapist and HERL Associate Director for Stakeholder Engagement. Together they visited with NIH scientific staff in a tour organized by **Tom Bulea**, a tenure-track investigator and Lead of the NeuroRobotics Research Group in the Clinical Center Department of Rehabilitation Medicine.

The potential that Cooper sees for the NIH is in building a more inclusive workplace with a critical mass of professionals from diverse backgrounds, who could turn to each other for advice and inspiration and ultimately serve the NIH mission in reducing the burdens of disabilities. ●

To watch a videocast of Cooper's talk, go to https://videocast.nih.gov/watch=46052. The website for the Human Engineering Research Laboratories is https://www.herl.pitt.edu.

Psychedelic Medicine Returns to the NIH

Lecture by a SIG in Development

BY *NIH CATALYST* STAFF

More than 60 NIH researchers representing many institutes, disciplines, and generations tuned in on January 24, 2023, for the inaugural meeting of the Psychedelic Science and Medicine Interest Group.

And if their enthusiastic reception was any indication, it appears that the NIH is primed to start anew on research on molecules, receptors, and neural systems that mediate the actions of psychedelic drugs.

Psychedelic drugs, according to the National Institute on Drug Abuse (NIDA), are characterized as classic hallucinogens that can cause users to see images, hear sounds, and feel sensations that seem real but do not exist. Such drugs include the synthetic hallucinogen LSD and natural products such as mescaline (peyote cactus) and psilocybin ("magic mushrooms").

The very notion of studies on psychedelics might conjure up memories of Timothy Leary, leader of the controversial Harvard Psilocybin Project, and even research funded by the NIH in the 1950s and 1960s. The early research environment was marred, however, by a naive and experimenting 1960s youth counterculture, in part instructed by Leary himself to "Turn on, tune in, drop out."

Universities and NIH began to question the safety and legitimacy of this line of research. Researchers themselves, by and large, did drop out…of studying psychedelics. The Controlled Substances Act of 1970 classified psilocybin, the main psychoactive constituent of psychedelic mushrooms, as a Schedule I substance—denoted as having no accepted medical use and a high potential for abuse.

Federal funding on psychedelics would remain dry for 50 years, until 2021 when Johns Hopkins University (Baltimore) was awarded a nearly $4 million NIH grant to investigate the potential effects of psilocybin on tobacco addiction. This study had followed a slow but steady resurgence in research with psychedelics in the preceding two decades on major depression, cancer-related existential distress, and substance-use disorders, funded mostly by philanthropy.

Today, researchers are seeing a surge of clinical trials nationwide using psychedelic drugs such as psilocybin and LSD, according to **David Goldman**, Clinical Director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

Goldman led the inaugural meeting of this interest group with a talk titled "State of Psychedelics," in which he discussed the history and nature of psychedelic drugs and summarized their diverse effects, mechanisms, and origins from plants, fungi, and even toads.

He discussed pitfalls in clinical trials with psychedelic drugs, including the importance of concurrent psychotherapy, expectancy, and placebo effects, and the peculiar problem that participants who do not receive the expected drug can react negatively, a phenomenon known as nocebo effect.

The robust change in research funding could be attributed to the success of the use of ketamine to treat depression and suicidal tendencies, according to **Carlos Zarate Jr.**, a world-renowned leader in ketamine research and Chief of the Experimental Therapeutics and Pathophysiology Branch at the National Institute of Mental Health.

Ketamine is a dissociative drug, not a classic hallucinogenic, according to NIDA. Zarate explained that in the 2000-2009 decade, the NIH intramural research program was able to conduct safe and well-designed clinical studies on ketamine and demonstrate its ability to elicit rapid and lasting improvement.

Also aiding in the psychedelic renaissance was the growing recognition of the importance of clinical setting. Goldman additionally mentioned a well-conducted study by researchers at Yale University (New Haven, Connecticut) and the University of New Mexico (Albuquerque, New Mexico) on the use of psilocybin and alcohol-use disorder.

CREDIT: ARP, WIKIMEDIA COMMONS

Fruit bodies of the hallucinogenic mushroom *Psilocybe semilanceata*, which produces psilocybin and other psychoactive compounds.

Jessica Laudie, a Postbaccalaureate Fellow in the NIAAA Office of the Clinical Director, originated the idea for the Psychedelic Science and Medicine Interest Group, seeking guidance from Goldman, **Nancy Diazgranados**, (NIAAA Deputy Clinical Director), and **Ann Berger** (Chief, Pain and Palliative Care, NIH Clinical Center).

"With a majority, if not all, of psychedelic research occurring outside the NIH, I realized there was a disconnect between the intramural program and psychedelic researchers," Laudie told *The NIH Catalyst*. "I wanted to create a space where those currently leading the movement could share their work with those who are interested in learning more, or who may have critical perspectives to offer." ●

For details about this group and instructions for joining its LISTSERV, visit https://oir.nih.gov/sigs/psychedelic.

NEW SIG: Rare Disease Informatics Scientific Interest Group

The goal of the Rare Disease Informatics (RDI) scientific interest group (SIG) is to engage investigators and analysts who are interested in applying computational techniques for biomedical data analysis to support rare-disease research. Collaboration and knowledge-sharing will be promoted among biomedical informaticians and rare-disease experts across the NIH.

The RDI SIG is a trans-NIH group in which investigators apply informatics approaches to curate, harmonize, standardize, and analyze biomedical data obtained from a variety of resources (such as gene sequences, bioassays, electronic health records and other forms of real-world data, and scientific publications) for clinical, biological, and public health research applications. The group will discuss the challenges and emerging technologies of integrating computational techniques into analysis workflows, and new developments in rare-disease informatics applications.

Meetings will be held the last Friday of each month, 10:00-11:00 a.m. (via Zoom at first) with first meeting being April 28, 2023. Recent journal articles, relevant projects, and opportunities for initiating collaborations will be discussed. Guest speakers will be invited periodically.

For more information, go to https://oir.nih.gov/sigs/rare-disease-informatics-scientific-interest-group or contact **Qian Zhu** (National Center for Advancing Translational Sciences) at qian.zhu@nih.gov. To join the RDI-SIG LISTSERV and receive notices of meetings, go to https://list.nih.gov/cgi-bin/wa.exe?SUBED1=RDI-SIG.

NEW SIG: iPSC-Based Disease Modeling Scientific Interest Group

This SIG on induced pluripotent stem cells (iPSC)-based disease modeling aims to bring together people who have a shared interest in advancing disease modeling using a common platform. This platform will facilitate the exchange of information and resources; the discussion of issues, ideas, and trends; and the sharing of expertise, discoveries, and best technical and scientific practices across iPSC-based disease modeling.

This SIG will help to build a network of stem-cell scientists across all NIH campuses and all the NIH institutes and centers who have diverse interests in patient-tissue development and in using this tool to model simple and complex diseases. The group will discuss common problems—in protocol development, reagent availability, efficiency, and reproducibility—that every stem-cell lab faces when differentiating tissues from iPSCs.

Meetings will be held on the second Thursday of each month, 3:00-4:00 p.m., via Zoom initially.

For more information, go to https://oir.nih.gov/sigs/ipsc-based-disease-modeling-scientific-interest-group or contact the Chair, **Fnu Ruchi** (Ruchi Sharma) in the National Eye Institute (fnu.ruchi2@nih.gov). To join the I-DISEASE-IG LISTSERV and receive notices of meetings, go to https://list.nih.gov/cgi-bin/wa.exe?SUBED1=I-DISEASE-IG. ●

NIH Intramural Scientific Interest Groups (SIGs) are assemblies of scientists with common research interests. SIGs form and evolve regularly as new scientific trends arise. To find out more about SIGS and see a list, go to https://oir.nih.gov/sigs.

A Sampling of SIGs

- 3D Printing and Modeling
- Antibody
- Asian American Pacific Islander Health
- Bioethics
- Bioinformatics
- Biomedical Engineering
- Breastfeeding and Human Lactation
- Cancer Metabolism
- Chemistry
- Cell Cycle
- Chromatin and Chromosomes
- Chronobiology and Sleep
- Consciousness Research
- COVID-19
- Cytokine
- Deep Learning in Biomedical Imaging
- Dietary Supplement
- DNA Repair
- Drosophila
- Gene Therapy
- Genetic Counseling
- Global Health
- GlycoBiology
- Health Disparities
- Hispanic Health Research
- Immunology
- Inflammatory Disease
- Lambda Lunch
- Myalgic Encephalomyelitis/Chronic Fatigue Syndrome
- Natural Products
- Nurse Practitioner/Physician Associate
- PAIN
- Pancreatic Cancer
- Patent Law & Technology Transfer
- Pediatric Clinical Research
- Religion, Spirituality, and Health
- Science of Science Communication
- Stem Cell
- Virology
- Virtual and Augmented Reality
- Zebrafish Frog

See full list at https://oir.nih.gov/sigs.

Stadtman Investigators


MUSTAPHA BOUHRARA, NIA


ADRIENNE CAMPBELL-WASHBURN, NHLBI


ROSS CHELOHA, NIDDK


BOBBY CHEON, NICHD


MEGAN CLARKE, NCI-DCEG

Meet 18 New Stadtman Investigators

Taking on Today's Scientific Challenges

COMPILED BY LAURA STEPHENSON CARTER AND MICHAEL TABASKO, OD

Inventing new ways to thwart viruses and treat diseases; developing early-detection methods for cancer; investigating the connection between neural circuitry and obesity; finding ways to reduce health disparities. These are just some of the challenges that the Earl Stadtman Tenure-Track Investigators have taken on.

The Stadtman program, a trans-NIH search process that began in 2009, is named for renowned biochemist, senior investigator, and mentor Earl Stadtman (1919–2008), who devoted his 57-year career at NIH to identifying the mechanisms of cellular energy expenditure and metabolism. The program crosses all areas of biomedical research and is designed to attract a diverse group of talented early-career scientists who might not apply to NIH via searches conducted by individual institutes and centers.

Meet the 18 Stadtman Investigators who were part of the 2019 recruiting cycle. For more on the Stadtman program, how to apply, and links to stories about other Stadtmans, go to https://irp.nih.gov/careers/trans-nih-scientific-recruitments/stadtman-tenure-track-investigators.

Mustapha Bouhrara, Ph.D., NIA

Magnetic Resonance Physics of Aging and Dementia Unit, National Institute on Aging

Research: Developing advanced magnetic-resonance imaging (MRI) acquisition and analysis methods for quantitative and specific neuroimaging of biomarkers of cerebral tissue microstructure and function; studying aging and age-related neurodegenerative diseases.

Became Stadtman Investigator: In 2020.

Adrienne Campbell-Washburn, Ph.D., NHLBI

MRI Technology Program, National Heart, Lung, and Blood Institute

Research: Developing novel MRI technology for cardiac imaging, lung imaging, and MRI-guided cardiovascular catheterization procedures. Translating new methods to clinical applications through collaboration with interventional cardiologists, imaging cardiologists, pulmonologists, radiologists, and critical-care physicians.

Became Stadtman Investigator: In 2020.

Ross Cheloha, Ph.D., NIDDK

Acting Section Chief, Chemical Biology in Signaling Section, Laboratory of Bioorganic Chemistry, National Institute of Diabetes and Digestive and Kidney Diseases

Research: Developing new methods and tools for the study of biomolecules, with a focus on designing new compounds for targeting cell-surface receptors; particularly interested in the preparation of conjugates that consist of synthetic molecules and proteins.

Became Stadtman Investigator: In 2020.

Bobby Cheon, Ph.D., NICHD

Social and Behavioral Sciences Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver *National Institute of Child Health and Human Development*

Research: Investigating the health impacts of psychological experiences associated with disparities, such as discrimination, low perceived social status, and economic and resource insecurities; examining contributions of such psychosocial factors to eating behaviors, food preferences, and diet-related chronic diseases such as obesity.

Became Stadtman Investigator: In 2021.

Stadtman Investigators

ALLANA T. FORDE, NIMHD

LUIS M. FRANCO, NIAMS

MENG-MENG FU, NINDS

THOMAS GONATOPOULOS-POURNATZIS, NCI-CCR

LEAH KATZELNICK, NIAID

Megan Clarke, Ph.D., M.H.S., NCI-DCEG
Clinical Genetics Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute
Research: Combining molecular, clinical, and population-based approaches to address etiology, prevention, and early detection of cervical, endometrial, and anal cancers.
Became Stadtman Investigator: In 2020.

Allana T. Forde, Ph.D., M.P.H., NIMHD
Epidemiology and Genetics Research Area, National Institute on Minority Health and Health Disparities
Research: Examining the impact of race-related stressors (such as discrimination) on cardiovascular health across the life course, with a focus on African American, Afro-Caribbean, and Afro-Latinx people; exploring biological mechanisms through which discrimination affects cardiovascular health; identifying protective and adaptive factors that could inform interventions.
Became Stadtman Investigator: In2020.

Luis M. Franco, M.D., NIAMS
Functional Immunogenomics Section, National Institute of Arthritis and Musculoskeletal and Skin Diseases
Research: Working at the intersection of clinical medicine, human immunology, genomics, and bioinformatics to understand how genes control the function of cells in the human immune system and how treatments that change the expression of human genes affect the behavior of immune cells; enabling the development of better treatments for human diseases that are caused by an overactive immune system.
Became Stadtman Investigator: In 2019.

Meng-Meng Fu, Ph.D., NINDS
Special Volunteer, Glial Cell Biology Unit, National Institute of Neurological Disorders and Stroke
Research: Studying the cell biology of oligodendrocytes (in the central nervous system) to better understand normal myelin development as well as demyelinating and neurodegenerative diseases.
Became Stadtman Investigator: In2020. Left NIH in January 2023 to become Assistant Professor in the Department of Molecular and Cellular Biology, University of California at Berkeley.

Thomas Gonatopoulos-Pournatzis, Ph.D, NCI-CCR
Stadtman Investigator and NIH Distinguished Scholar, RNA Biology Laboratory, Center for Cancer Research, National Cancer Institute
Research: Studying the regulatory pathways and functional roles of alternative splicing and other pre-mRNA processing events in mammalian cells; characterizing alternative splicing programs that underlie phenotypes related to normal physiology and disease states.
Became Stadtman Investigator: In2020.

Leah Katzelnick, Ph.D., NIAID
Chief, Viral Epidemiology and Immunity Unit, National Institute of Allergy and Infectious Disease
Research: Using a multidisciplinary approach encompassing virology, immunology, and epidemiology to investigate protection against and susceptibility to emerging viruses; informing safe and effective deployments of vaccines; working with dengue as a model pathogen for other complex, immune-evasive viruses.
Became Stadtman Investigator: In 2020.

CONTINUED ON PAGE 22

Stadtman Investigators

ERIKKA LOFTFIELD, NCI-DCEG

ANDREW LUTAS, NIDDK

LEONARDO MARIÑO-RAMÍREZ, NIMHD

DOREEN MATTHIES, NICHD

YEKATERINA MIROSHNIKOVA, NIDDK

Erikka Loftfield, Ph.D., NCI-DCEG
Metabolic Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute
Research: Studying the interplay between diet, metabolism, the microbiome, and genetics, and their effects on cancer risk; leveraging developing technologies to improve dietary assessment and gain insights into diet-cancer associations.
Became Stadtman Investigator: In 2020.

Andrew Lutas, Ph.D., NIDDK
Acting Section Chief, Neuromodulation and Motivation Section, Diabetes, Endocrinology, and Obesity Branch, National Institute of Diabetes and Digestive and Kidney Diseases
Research: Understanding the principles of neuromodulation of brain circuits that control motivation; uncovering treatment strategies for obesity and comorbid diseases.
Became Stadtman Investigator: In 2022.

Leonardo Mariño-Ramírez, Ph.D., NIMHD
Epidemiology and Genetics Research Area, National Institute on Minority Health and Health Disparities
Research: Analysis of genetic ancestry and electronic health records in large biobank cohorts to characterize how genetic and environmental risk factors interact to influence health disparities.
Became Stadtman Investigator: In 2020.

Doreen Matthies, Ph.D., NICHD
Unit on Structural Biology, Eunice Kennedy Shriver *National Institute of Child Health and Human Development*
Research: Using a combination of molecular biology, biochemistry and biophysical methods with a focus on cryoelectron microscopy to study the structure and function of membrane protein complexes in their native lipid membrane environment; understanding how various microenvironments are formed and maintained, and how they influence the structure and function of membrane proteins.
Became Stadtman Investigator: In 2020.

Yekaterina Miroshnikova, Ph.D., NIDDK
Acting Section Chief, Section on Nuclear Mechanotransduction and Cell Fate Dynamics, Laboratory of Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases
Research: Using cutting-edge, interdisciplinary approaches to understand the role of nuclear mechanotransduction in modulating genome architecture and gene expression patterns to tune stem-cell fate.
Became Stadtman Investigator: In 2021.

Matthew Wolf, Ph.D., NCI-CCR
Head, Cancer Biomaterials Engineering Section, Cancer Innovation Laboratory, Center for Cancer Research, National Cancer Institute
Research: Designing complex 3D tumor models and next-generation cancer immunotherapies using a multidisciplinary combination of biomaterials science, cancer immunology, and tissue engineering.
Became Stadtman Investigator: In 2020.

Stadtman Investigators

MATTHEW WOLF, NCI-CCR

COLIN (CHIH-CHIEN) WU, NCI-CCRI

RYAN YOUNG, NCI-CCR

Colin (Chih-Chien) Wu, Ph.D., NCI-CCR

Head, Translational Control of Gene Expression Section, RNA Biology Laboratory, Center for Cancer Research, National Cancer Institute

Research: Exploring the role of the ribosome in stress-response signaling pathways and translational regulation in mammalian systems; using an integrated approach that combines mass spectrometry, CRISPR screens, high-throughput chemical probing, ribosome profiling, biochemical techniques, and computational tools.

Became Stadtman Investigator: In 2020.

Ryan Young, Ph.D., NCI-CCR

Lymphoid Malignancies Branch, Center for Cancer Research, National Cancer Institute

Research: Using cutting-edge proteogenomic techniques, high-resolution microscopy imaging, and biochemical approaches to elucidate molecular mechanisms underlying oncogenic signaling in multiple myeloma (MM); finding new opportunities for the targeted treatment of MM by exploiting druggable pathways.

Became Stadtman Investigator: In 2020.

Read about Rare Disease Day in the May-June 2023 issue of *The NIH Catalyst*.

Faucet of Youth

CONTINUED FROM PAGE 13

influences aging. One theory is that poor hydration habits trigger chronically high levels of hormones that regulate water balance in the body, such as antidiuretic hormone (ADH). ADH acts on the kidney to conserve water but also affects all organs and might be responsible for a slow accumulation of tissue damage that eventually leads to chronic disease.

The NHLBI team has plans to analyze how individual chronic diseases might be separately linked to hydration status. They note that the new findings don't prove causality and that intervention studies are needed to confirm the link between hydration, biomarkers of hydration such as ADH, and aging.

Population surveys have shown that approximately 50% of people worldwide don't drink the recommended amount of water. This could be due to factors such as thirst sensation, which diminishes as we age, or family habits, perceptions, and traditions. "People have to pay attention to how much they drink," said Dmitrieva. "Don't rely on that thirst sensation or waiting to drink only at meals."

Individual water needs vary. The National Academies of Medicine suggest that most women consume around 6-9 cups of fluids daily. For men, it's 8-12.

Check out the "News and Events" link on the Intramural Research Program website for "In the News," "Speaking of Science Podcast," "I am Intramural Blog," "SciBites Video Shorts," and "Events" at https://irp.nih.gov/news-and-events.

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If you have a photo or other graphic that reflects an aspect of life at NIH (including laboratory life) or a quotation or confession that scientists might appreciate and that would be fit to print in the space to the right, why not send it via e-mail: catalyst@nih.gov or mail: *The NIH Catalyst*, Building 1, Room 160.

Also, we welcome "letters to the editor" for publication and your reactions to anything on *The NIH Catalyst* pages.

LONGER ARTICLES AND MORE PHOTOS ONLINE AT
https://irp.nih.gov/catalyst/31/2.

PHOTOGRAPHIC MOMENT

Winter Wonderland

CREDIT: RYAN KISSINGER (OPERATING DRONE), NIAID

The photo shows the sun rising over the Sapphire Mountains and the south boundary of NIAID's Rocky Mountain Labs campus in Hamilton, Montana. The Comparative Medicine Center, under construction (white building on far left), is on schedule to open in 2024. Read more about the construction project at https://irp.nih.gov/catalyst/30/1/news-you-can-use-construction-updates.

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Address correspondence to:
Building 1, Room 160, NIH
1 Center Drive
Bethesda, MD 20892
Ph: 301-402-1449
e-mail: catalyst@nih.gov

The NIH Catalyst online:
https://irp.nih.gov/catalyst

PUBLISHER
NINA F. SCHOR
Deputy Director for Intramural Research, OD

EDITORS
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Chief Scientific Officer, CC, and NIH Associate Director for Clinical Research

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RONALD SUMMERS, CC
WEI YANG, NIDDK