

Andrews, Roth Advocate for Decriminalizing Mental Illness

BY DANA TALESNIK

Science is an integral part of the equation, as research continues toward new and improved medical treatments for people with mental illness. Another factor is how society cares for and protects them.

“We’ve made it a crime to have a mental illness,” said Alisa Roth, author of *Insane: America’s Criminal Treatment of Mental Illness*, who spoke at a recent NIMH Director’s Innovation Speaker Series lecture at the Neuroscience Center.

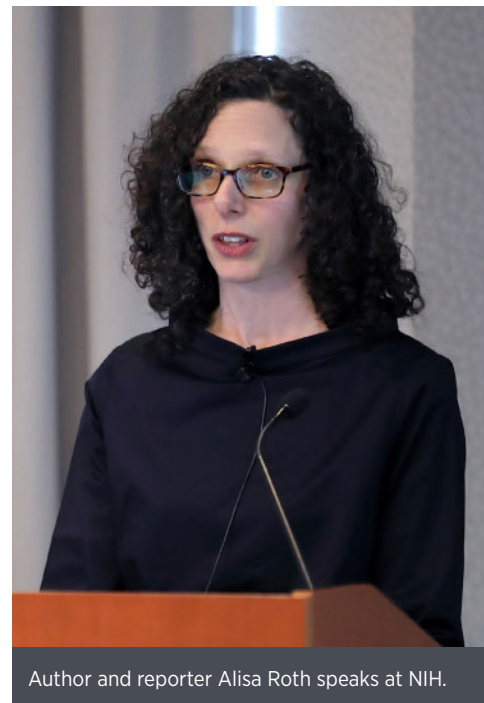
U.S. prisons are crowded with mentally ill people, a longstanding crisis within our criminal justice system that needs to change,

argued Roth, who is currently a mental health reporter for Minnesota Public Radio.

The statistics are staggering. Half of all people in U.S. jails have a diagnosed mental illness, said Roth, adding that numbers are even higher among various demographics. This population is also less likely to make bail or parole, so they sit in jail longer.

“We have a jail population that’s harder to deal with, that’s more mentally ill,” concurred Phil Andrews, director of crime prevention initiatives for the State’s Attorney’s Office in Montgomery County, Md., who also spoke at the lecture. Overall incarceration numbers are declining in the county and nation, he said, while the number of people in jail with mental illness has substantially increased. Based on mental health assessments during booking, he said, the number in Montgomery County has doubled in the last 8 years.

SEE **DECriminalize**, PAGE 4



Author and reporter Alisa Roth speaks at NIH.



NLM exhibition highlights rubella vaccine, p. 2.

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MAKING ‘BUREAUCRATIC’ SEXY Seminar Speaker Seeks Rewrite of Innovation Script

BY CARLA GARNETT



Dr. Mariana Mazzucato

Did you know that government innovation helped develop smartphone technology? It’s true. In fact, NIH, along with the National Science Foundation and the Department of Defense, invested early in research on liquid crystal display, which was incorporated into the first-generation iPhone that debuted in 2001. And that’s just one of more than a dozen

SEE **INNOVATION**, PAGE 6

West Offers Ideas for Managing Physician Burnout

BY MOHOR SENGUPTA



Dr. Colin West

Most of us loosely use the word burnout from time to time, but in a lecture delivered at Clinical Center Grand Rounds recently by Dr. Colin West of the Mayo Clinic, the specific definition of burnout was clarified

as a syndrome with three main domains: depersonalization, emotional exhaustion and a sense of low personal accomplishment. All lead to decreased effectiveness at work.

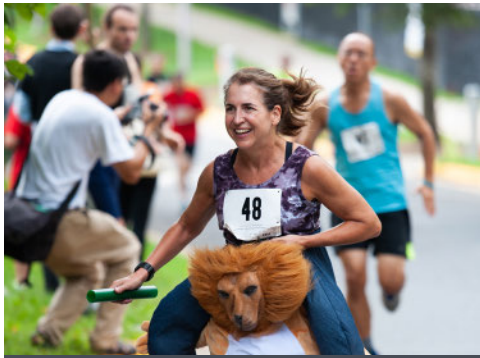
“This is a workplace phenomenon,”

SEE **BURNOUT**, PAGE 8

Institute Relay Set, Sept. 18

It's time for the 36th NIH Institute Relay and the event is moving back to Bldg. 1. It will be held Wednesday, Sept. 18 at 11:30 a.m.

Can your team defeat the defending champs "Work Time's Over?" The rules are the same—the relay consists of teams of five runners, each of whom runs a half-mile loop around Bldg. 1. All institutes, centers, divisions and contractors are invited to enter as many teams as they wish. Each team must have male and female runners with at least two runners of the same sex.



A participant gallops in the 2018 relay.

Take the coming days to gather for jogs around Bldg. 1 or visit the fitness center in Bldg. 31 for a run on the treadmill or elliptical machine. The relay is a great reason to set a new fitness goal while preparing for a fun event. However, the most important part of the race is to have fun and enjoy the company of your fellow NIH'ers.

Register your team for \$25 at <https://govemployee.com/nih/event-detail/36th-nih-institute-relay/>. Each group leader is asked to provide the name and contact info for at least one volunteer. Don't forget to visit with event exhibitors as well. To volunteer or for more information, contact David Browne at browned2@mail.nih.gov or call (301) 594-2411.



At left, one of almost 40 million U.S. children gets a rubella vaccine. At right, a newly vaccinated child proudly displays his "official rubella fighter" card and button.

PHOTOS: CDC

NLM Hosts Exhibition on Rubella

When modern medicine nearly eradicates a disease, it can be easy to lose touch with the pain and disability the disease once wreaked on society as the decades roll by. In 1964, a rubella (German measles) epidemic raged in America, affecting tens of thousands of families. Scientists rushed to develop screening tests and, ultimately, a vaccine, which became available in 1969.

To remember how experts and parents tried to limit rubella's impact before an effective vaccine eliminated the disease from the United States, the National Library of Medicine curated an exhibition to honor the 50th anniversary of the first commercially available rubella vaccine, developed by two NIH intramural researchers. The exhibition—*Rashes to Research: Scientists and Parents Confront the 1964 Rubella Epidemic*—features photos, posters and documents chronicling the impact of the disease and the development, licensing and administering of the vaccine that nearly eliminated rubella in the United States.

Highly contagious, rubella infections begin with a cold-like illness and fever, followed by a rash. But many who contracted the virus had no symptoms at all. In 1964-1965, at the height of the epidemic, 20,000 children were born with congenital rubella syndrome, which caused cognitive disabilities and serious heart, hearing and vision problems related to rubella exposure during pregnancy. Tens of thousands more families lost or terminated pregnancies. When the vaccine debuted, demand was enormous; public health officials vaccinated almost 40 million children over a 4-year period.

The exhibition is on display in Bldg. 38 until Sept. 25. Its website will remain online at <https://www.nlm.nih.gov/exhibition/rashestoresearch/index.html>.



Dr. Rita Charon

PHOTO: ERICA LANSNER

Charon To Give Annual Gadlin Lecture, Sept. 24

Dr. Rita Charon will be the guest speaker at the second annual Gadlin Lecture Series, honoring former longtime NIH ombudsman Dr. Howard Gadlin. Her topic is "To See Life Everywhere: The Urgency of Personal Stories in Medicine." The talk will be held Tuesday, Sept. 24 at 2 p.m. in Masur Auditorium, Bldg. 10.

Charon recently gained acclaim as the 2018 National Endowment of the Humanities Jefferson Lecturer. She is a physician, a literary scholar and founder of narrative medicine; she serves as chair of this program at Columbia University. Narrative medicine

is a movement within medical education to bring ideas of literary scholarship into the realm of clinical practice.

After completing her residency at Montefiore Hospital and Medical Center in the Bronx in 1982, Charon joined the faculty of the College of Physicians and Surgeons at Columbia University. There she began considering problems in the medical profession that the humanities could help address. Her colleague in narrative medicine Dr. Craig Irvine of Columbia University quotes an article of hers from 1986 that captures her concerns: a medical culture that is "mechanistic, paternalistic, misguided and ultimately ineffective." The solution, Charon argues, is to center medicine "on its true subject of concern: the lives of the people it serves."

Sign language interpreting services are available on request. Individuals who need this or other accommodation to participate should contact Sarah Kith at sarah.kith@nih.gov or the NIH Interpreting Office directly, via email, at niha@ainterpreting.com. Requests should be made at least 5 days before the event.

'Cell' Editor Pulls Curtain Back on Journal's Inner Workings

BY GREG LAVINE

As *Cell* editor-in-chief Dr. John Pham showed pictures of his editorial team on a screen, he asked the conference hall full of researchers to keep in mind that real people are behind the decisions to accept or reject a science paper.

Pham spoke recently at the National Institute of Arthritis and Musculoskeletal and Skin Diseases' annual Intramural Research Program scientific retreat to offer a glimpse into how the journal *Cell* operates.

"I think it is important for us to see each other as actual people and not just names on a manuscript or names on the masthead of a journal," he noted, "or as 'reviewer number three' who has a very bad reputation—nobody seems to like them—but they are somebody I would not have chosen if I didn't trust their judgement, if I didn't respect them as a scientist and if I didn't think they were trying to do something that benefited science."

Pham joined Cell Press in 2008 as part of the *Molecular Cell* editorial team and became the



publication's editor-in-chief in 2012. In 2018, he was named the top editor for *Cell*.

"In our ecosystem, *Cell* is at the top, so we have a very high bar for what makes it into *Cell*," he said. "We are interested in things that are broadly interesting that are not only going to impact the fields that the papers are about but that other people will find interesting."

The *Cell* team begins the publication process with editors voting, based on the title and abstract for each incoming paper. Submissions of interest are



Cell editor-in-chief Dr. John Pham speaks at NIAMS.

PHOTOS: GREG LAVINE

then assigned to an editor for further evaluation of the full paper, he explained.

For *Cell*, a succinct title and a strong abstract can help improve a paper's odds of being published,

• • •

"Try to see [criticism] as a gift, absorb it and try not to take offense."

-DR. JOHN PHAM

• • •

Pham said. These same factors come into play later when busy readers will spend time to read through a published paper.

"I know you think your work is important," he said of the abstract, "but the reader has not been working on this for years, doesn't know all the acronyms, doesn't know all the background."

A good cover letter can also boost the chances for a paper to be assigned for review. Pham stressed that authors should avoid repeating the abstract and instead focus on additional information. If your findings are competitive or controversial, mention this in the cover letter.

Papers of interest are assigned to external peer reviewers. Pham said he understands that the competitive world of science research can spark intense emotions as study authors deal with critical reviewer feedback and sometimes outright rejection.

While criticism is often hard to digest, Pham said he hopes authors can view this type of feedback as being potentially helpful.

"Try to see it as a gift, absorb it and try not to take offense," he said.

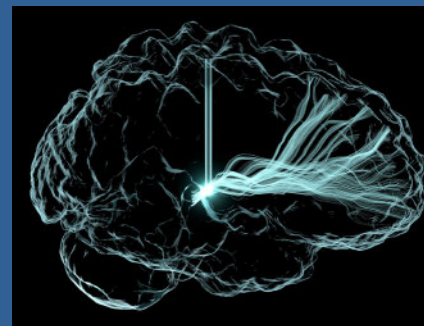
For papers in need of work, *Cell* may send an "open door" rejection that invites significant revisions. Papers with conceptual or technical problems—or both—will receive a hard rejection.

Pham said authors have the right to appeal any type of rejection, but he recommended being judicious. If you think the editorial team or reviewers missed something, you can appeal. But he asked authors to go beyond just arguments.

"You have to add something, either a clarification or specific changes you're going to add, improvements you're going to make," he said.

At the end of the process, papers are not simply judged by adding up the positive and negative reviews. Sometimes a lone reviewer can make or break a paper, even if that person holds the minority view.

"There may be mostly negative reviews and we consider what they say, but we may agree with the more positive review," he said for some papers that have gone on to appear in *Cell*. **R**



ON THE COVER: "Light Me Up." Light-based rendering of deep brain stimulation's electrical excitation of neuronal fiber pathways to treat patients with traumatic brain injury. 1st place winner, BRAIN Initiative Photo and Video Contest, 2019

IMAGE: ANDREW JANSON, SCIENTIFIC COMPUTING AND IMAGING INSTITUTE, UNIVERSITY OF UTAH

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Decriminalize

CONTINUED FROM PAGE 1

Roth has interviewed prisoners, psychiatrists and law enforcement officials around the country and has witnessed vile conditions and flagrant abuses of the mentally ill during prison visits.

“This is not how we should be treating anybody, let alone the sickest and most vulnerable people in our society,” she said.

Ironically, though, the only people in this country with a constitutional right to health care are those in prison. “It goes without saying that there’s something truly wrong with a society [where] the only way you can guarantee getting health care is to get arrested,” said Roth.

To illustrate her point, Roth shared the story of Edgar Coleman, a Minnesota man whose life had seemed promising. After a stint as a pro football player, he earned his master’s in psychology and taught in public schools and as an adjunct college professor. Coleman’s life took a turn in his mid-50s when he developed schizophrenia, possibly related to a brain injury from his football days. He couldn’t work, separated from his wife and became homeless.

Coleman began sleeping in stairwells at his alma mater, the University of Minnesota, where he sometimes helped himself to free food at lectures. From 1996 to 2012, Coleman was arrested more than 200 times,



Roth and attorney Phil Andrews have ideas on how to decriminalize mental illness.

PHOTOS: CHIA-CHI CHARLIE CHANG

★ ★ ★

“This is not how we should be treating anybody, let alone the sickest and most vulnerable people in our society.”

—ALISA ROTH

★ ★ ★

an average of an arrest a month for 16 years, for petty crimes such as trespassing and panhandling.

“Everybody involved in this story was trying to do the right thing: the person who called 911, the police who would pick him up,” said Roth, “but it really wasn’t doing much for him or the university to make things better. Because of people like him, we have turned the criminal justice system into our *de facto* health care system.”

Circumstances vary, of course, but there are many people out there like Coleman, doing hard time for low-level crimes. How will time in prison help the person get better, asked Roth, or help the person manage and succeed once released?

Part of the fix, argued Andrews, is a mental health court, which diverts offenders from prison to long-term community-based treatment. Almost every state has at least one. Maryland has several, including two in Rockville that began operating in 2016.

“In Montgomery County, we’re seeing an increased number of defendants come in who need mental health care and shouldn’t be languishing in jail,” said Andrews. Mental health courts offer an alternative.

“The strongest selling point to the public is that mental health courts improve public safety,” said Andrews, noting a significant reduction in repeat offenses after participants complete the program. “And they are definitely good for participants in helping them get back on their feet, become independent [and] lead more productive lives.”

In Rockville, 30 of 103 participants have already graduated from the 12- to 18-month voluntary program, a statistic that will increase as remaining early participants advance and as the new program expands, said Andrews. The participant must have a diagnosed mental illness that contributed to committing the low-level crime. Not only do first-time offenders—who make up a

significant portion of the mental health court participants—avoid jail time, but also they can avoid a criminal record by completing the program, which among other things improves their employment potential.



Andrews argues for the merits of mental health courts.

Additional pre-arrest diversion, as well as non-criminal justice system preventive solutions, are needed, said Andrews, including more mental health services, supported employment, supervised housing, additional beds in psychiatric hospitals as well as effective medical interventions.

Receiving good care doesn’t guarantee that a mentally ill person won’t commit a crime, said Roth. “But there are plenty of people who could have avoided ending up in the criminal justice system if they had gotten the care they needed.”

Jails could be less crowded. Resources could be better utilized. And people like Edgar Coleman could see their lives turn out differently, having every opportunity to be, and remain, productive members of society. **R**

NCCIH Marks 20th Anniversary with Scientific Symposium, Sept. 23

In 1998, Congress established the National Center for Complementary and Alternative Medicine—renamed the National Center for Complementary and Integrative Health in 2015—at NIH by amending

Title IV of the Public Health Service Act.



Dr. Lorimer Moseley

This year, NCCIH will celebrate its 20th anniversary with a 1-day scientific symposium. “NCCIH at 20: A Catalyst for Integrative Health” will take place on Monday, Sept. 23 from 9 a.m. to 4:30 p.m. in Lipsett Amphitheater, Bldg. 10. The event will highlight progress in

complementary and integrative health research and look to the future of the field.

Dr. Francis Collins, NIH director, will give opening remarks and NCCIH director Dr. Helene Langevin will introduce keynote speaker Dr. Lorimer Moseley, whose topic is “Why We Need a Pain Revolution: From Science to Practice.” The talk is also the annual Stephen E. Straus Distinguished Lecture in the Science of Complementary Therapies, honoring NCCIH’s founding director.

Additional sessions include lightning round presentations by early-stage investigators; panels on pain research in military and veteran populations and on developments in natural products research; and a talk by Langevin, with deputy director Dr. David Shurtleff, on future directions in the field.

The keynote speaker is professor of clinical neurosciences and chair in physiotherapy in the School of Health Sciences at the University of South Australia. Internationally renowned for his innovative and rigorous research and his work in science communication and patient advocacy, Moseley has a longstanding interest in understanding, preventing and treating persistent pain. He holds a doctorate in medicine from the University of Sydney and an Sc.D. from the University of South Australia. Following postdoctoral work at the University of Queensland, he was the first physical therapist to win the Nuffield Medical Research Fellowship in the department of physiology at Oxford University, U.K., where he investigated the role of the brain and mind in chronic pain disorders.

Moseley is founder and director of Pain Revolution, a University of South Australia initiative; is senior principal research fellow at Neuroscience Research Australia; and chairs the PainAdelaide Stakeholders’ Consortium. His five books include a worldwide bestseller, *Explain Pain*.

Registration is requested to attend NCCIH’s symposium, either in person or by videocast, at <https://nccih.nih.gov/news/events/NCCIH-20>.

SEPT. 17

McSweeney To Give NINR Director’s Lecture

On Tuesday, Sept. 17, Dr. Jean C. McSweeney will present “Matters of the Heart: A Research Journey Uncovering Signs of Heart Disease in Women,” from 10 to 11 a.m. in Lipsett Amphitheater, Bldg. 10. She will discuss her program of research that focuses on the symptoms of heart disease in women. The lecture will also be broadcast live and archived at <http://videocast.nih.gov>.



McSweeney is a professor and associate dean for research at the University of Arkansas for Medical Sciences in Little Rock. She is a research pioneer in the field of women’s cardiovascular disease, publishing the first study that described women’s symptoms. Her studies about women’s prodromal and acute symptoms of heart disease across ethnic groups have received international media coverage. She served as lead author on the American Heart Association’s (AHA) *Scientific Statement on Ischemic Heart Disease in Women*. McSweeney is the recipient of numerous awards, including AHA’s Katharine A. Lembright Award.

She received her B.S.N. from Cameron University in Lawton, Okla., her master’s from the University of Texas at Arlington and Ph.D. from the University of Texas at Austin. She has served on the National Advisory Council for Nursing Research and the NIH Council of Councils. She is a

fellow in the AHA and the American Academy of Nursing.

For more information and to register, visit <http://ow.ly/1cYc50vr8J5>.

NIBIB Touts ‘Five Cool Technologies’

Life-saving medical technologies, from vaccines to imaging technologies, are part of the history and legacy of NIH. We all work to support the NIH mission, even if we all aren’t developing the technologies ourselves. Letting your family, friends and acquaintances know some examples of NIH-supported technologies goes a long way in raising awareness about the critical importance and long-term impact of NIH investment.

To that end, the National Institute of Biomedical Imaging and Bioengineering has produced a series of brief videos in recent years that shine a spotlight on exciting technologies developed at labs around the country that are funded by the institute. The latest in the video series, called

“5 Cool Technologies Your Tax Dollars are Funding,” features advances that may help people stay healthy, get treatment sooner or have a better quality of life. The five technologies highlighted in the short video, released in August, are:

- A painless, non-invasive blood glucose monitoring device to replace testing by a finger-prick
- A skin patch that monitors blood pressure continuously using ultrasound, without a cuff
- A painless laser scan for breast cancer screening, instead of a mammogram
- A fingernail scan to count white cells for patients having chemotherapy, as an early indicator for risk of infection
- A prosthetic hand that provides a sense of touch for the user.

Become more familiar yourself with NIH-funded technologies—and tell a friend to view the video at <https://www.youtube.com/watch?v=kRP4i-WZGSU&t=40s>.





NIH deputy director for management Dr. Alfred Johnson (l) and NIH deputy director for intramural research Dr. Michael Gottesman (r) chat with Mazzucato before her lecture.

PHOTOS: DANIEL SOÑE

Innovation

CONTINUED FROM PAGE 1

components—microprocessors, lithium-ion batteries and DRAM cache, for example—of today’s cell phones that can trace its origins in some way back to federal ingenuity.

It’s arguably one of the coolest—and nowadays most essential—inventions so far in the 21st century and government’s crucial role in its development is hardly ever acknowledged. That may be because of perception: Most folks view the private sector as this wildly creative, cutting-edge space while they see government solely as a safe, risk-averse, rescue zone.

Time to flip the script, says Dr. Mariana Mazzucato, professor in the economics of innovation and public value at University College London (UCL), founder-director of the UCL Institute for Innovation and Public Purpose and recent NIH guest.

For the global economy’s sake, she suggested, thought leaders here and elsewhere in the public sector should all help change the narrative.

“I want to make the word ‘bureaucratic’ a really sexy word,” she said, cracking a smile but speaking in earnest. “So when something is described as bureaucratic, I want people to go, ‘Oh how cool!’”

It’s not in her official bio, but the economist could easily also practice linguistics. She visited NIH recently in Masur Auditorium, hoping to provoke an interactive discussion about the role of the government in modern-day capitalism.

Her talk—“The State and Innovation—From Fixing Markets to Co-Creating,” the final lecture in last season’s Deputy Director for Management Seminar Series—challenged the audience to widen its vocabulary and tell more complete stories about who leads innovation.

“Storytellers rule the world,” Mazzucato said, recalling philos-

opher Plato’s declaration. “The history of innovation in modern-day capitalism has a lot of bureaucracy behind it. We know so little about it because of the myths that continue to exist...The state—this decentralized network of different types of public institutions—has been the foundation of so much of the competitiveness across different sectors, from energy to information technology to health.”

When you think of what government agencies do in the marketplace, terms like de-risk, enable, incentivize and facilitate often come to mind, Mazzucato said. But do such words capture the full gamut of the breakthrough research, creative vibe and dynamic environments found at federal institutions such as NIH, DARPA and the Department of Energy?

Public funding, Mazzucato noted, has been vital in such game-changing innovations as the internet, Global Positioning System and touch-screen display. About \$5 billion in government funding helped engineer-entrepreneur Elon Musk bring the widely successful Tesla electric car concept to market, she pointed out.

Indeed, lots of federal entities constantly pioneer in a wide range of fields and historically have led innovation on a number of fronts, she said. They just rarely get the credit for it in public discourse.

“This notion that the state is there to fix failures is not really wrong,” she explained. “It’s just really limiting.”

Take “spending” versus “investing,” she

said. Civil servants are most likely to be called spenders, not investors, the name reserved for risk-takers perceived as hip, cool and attractive.

“The state has been an investor of first resort, not just a lender of last resort,” Mazzucato said.

Noting that in one book about iPhone creator Steve Jobs and Apple, there is virtually no mention of the huge public sector contribution to the success of its products, Mazzucato explained, “It’s not to dismiss the [crucial design elements of the iPhone] and the talent inside Apple. It’s to dismiss this very narrow, skewed way that we tell that story.”

After the most recent worldwide financial crises, the idea reemerged that economic growth has not just a rate but a direction, Mazzucato said. “All of us are now rethinking that direction towards smart growth, which translates to better innovation; sustainable growth, which is more green; and inclusive growth,” which tries to spread gains more equally among diverse peoples.

“The role of a public actor,” she continued, “should be not only to throw money into the system but also to catalyze a transformation of a system,” as in the green sustainability market. “To do that you often need to upset the status quo, to get the private sector to behave differently from how it is behaving.”

Mazzucato said forethinking governments are considering how best to use the investment tools they have—grants, equity, loans, procurement policy—to influence the direction of private sector enterprises and “make receiving such funds conditional on achieving public objectives.”



In the FAES bookstore, Mazzucato talks informally and signs copies of her book.



"Redefine the landscape," Mazzucato urged.
"Don't just fix the existing landscape."

Public sector enterprises such as NIH, she said, are legitimate "co-creators and co-shapers of the market," who "bring together different voices at the table to define the market in the first place." That powerful leadership can galvanize cross-sectoral, cross-action, cross-disciplinary, multiple competing solutions.

"Redefine the landscape," Mazzucato urged. "Don't just fix the existing landscape."

She offered a 4-part "people's prescription" for re-imagining health innovation to deliver public value:

- Use a mission-oriented approach to improve health outcomes
- De-link innovation funding from high prices
- Achieve public return through conditionality
- Explore alternative ownership and corporate governance models beyond shareholder value.

Continuing the misperception that the private sector is the most innovative part of public-private partnerships and should therefore set prices and define the market is a bad deal, Mazzucato concluded.

"That doesn't mean we shouldn't partner," she said. "Of course we must partner. We can only tackle any of these problems together, but how you do it matters."

Following her talk and a brief Q&A session, Mazzucato chatted informally and signed copies of her books at a meet & greet event sponsored by FAES in its bookstore.

You can read the full people's prescription online at <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2018/oct/peoples-prescription>. **R**

WATER QUALITY AT CENTER STAGE

Iowa Hosts Birnbaum's Last Community Forum

BY KELLY LENOX

Concerns about water quality took center stage in Mt. Vernon, Iowa, at a recent public meeting held by NIEHS and National Toxicology Program director Dr. Linda Birnbaum. A few weeks later, she announced her upcoming retirement, making the Iowa forum the last of 25 such meetings she has held during her tenure.

The NIEHS-funded University of Iowa Environmental Health Science Research Center sponsored the event. The visit included a tour to three farms with different acreages, products and practices, so the visitors could understand the varieties of local agricultural operations and the challenges faced by farmers in the region.

As at all her community forums, Birnbaum asked local organizers to select a key issue to focus on. By listening to voices in urban and rural settings across the country, she learns about environmental health issues and how they may vary from one area to another.

"Some of our best research is the result of strong community participation in the process," said Birnbaum. Her passion for community involvement was noted by NIH director Dr. Francis Collins

when he announced her retirement, which is effective Oct. 3. "She has been a strong proponent of community-based participatory research and she has actively engaged local residents in identifying, planning and reporting on environmental conditions that require both basic and applied research to understand potential health effects," he wrote in a statement.

Iowa's senators, from both sides of the aisle, sent staff members to the meeting.

The water quality research theme of the 25-year-old Iowa center reflects the state's long-term interest in the issue. "Seventy percent of rural residents get their drinking water from private, unregulated water supplies whereas virtually all urban dwellers drink public water that is regulated and monitored," according to the center's water quality research theme web page.

Local residents packed the room to raise questions about pesticide and fertilizer use, scale of operations, runoff, cancer and other topics.

At the end of the evening, Birnbaum was interviewed for a video that the center will produce. According to John Schelp of NIEHS's Office of Science Education and Diversity, the product will be similar to a video produced by the University of California at Davis after last year's forum in California's San Joaquin Valley.

"These community forums are part of Dr. Birnbaum's legacy," Schelp said. "She's visited neighborhoods from Harlem to Marin County, from Seattle to the Gulf of Mexico, and from San Juan [Puerto Rico] to St. Lawrence Island [Alaska]."



NIEHS and NTP director Dr. Linda Birnbaum (c) meets with staffers from Iowa's two senators: Brittney Carroll (l) from Sen. Joni Ernst's office and Rochelle Fuller (r) from Sen. Chuck Grassley's office.

PHOTO: JOHN SCHELP



"I cast [burnout] as a public health crisis," said West.

PHOTOS: MARLEEN VAN DEN NESTE

Burnout

CONTINUED FROM PAGE 1

West said. Burnout is defined as emotional weariness—a feeling of nothing left to give to your patients—and depersonalization—a sense of becoming callous toward the experiences of others. About 40,000 medical students, 60,000 residents and fellows and nearly half a million physicians experience



“Physicians who are burned out are more likely to reduce their [hours] and are more likely to retire early.”

—DR. COLIN WEST



burnout symptoms at any given time in the United States.

Medical students begin their careers with lower burnout than their age-matched peers, West said. There is something wrong with a system that leads these individuals to experience higher rates of depressive and burnout symptoms than their age-matched peers by the second or third year of their medical education, he added. Physical, mental and emotional quality of life domains also flip from the first to the third year.

In a 2008 study of internal medicine students, the burnout rate was 51 percent, and the depersonalization rate was nearly a third of the number of people studied. “This is not what we are looking for from a professional ideal standpoint, for ourselves or for our future colleagues, as the next generation of people taking care of all of our patients and taking care of us,” West observed.

Three surveys on practicing physicians done in partnership with the American Medical Association show that although the overall rate of burnout decreased during the period 2014–2017, a quarter to a third of individuals would meet the criteria for depression if they went through a medical assessment. Also, during this time a substantial number of physicians with burnout were likely to have retired from practice, reducing the overall burnout rate among respondents.

“Physicians who are burned out are more likely to reduce their [hours] and are more likely to retire early,”

West said. This “career survival bias” might be responsible for underrepresentation of late-career physicians with burnout in well-being surveys, leading to overall falsely positive estimates of burnout rates.

Medical professionals experience the highest overall burnout rate compared to other professions, including scientists. Higher burnout rate is correlated with frontline specialties such as emergency medicine and primary care and with tours of duty exceeding 50 hours per week. “Burnout at work results when demands of the job chronically outstrip the resources that are available to support that job,” West said.



Why care about burnout when physicians are better compensated than most other professionals? A mix of negative outcomes—such as diminished patient satisfaction, reduced hours, switching jobs, early retirement, depression, suicidal ideation and public safety issues such as increased accidents and near-miss rates for internal medicine residents—has been conservatively estimated to cost the health care economy roughly \$4.6 billion a year, according to a study done in partnership with Harvard Business School. “That \$4.6 billion doesn’t appear in any economic analysis of our health care system at this point; I cast this as a public health crisis,” West stated.

Some of the ways to address physician burnout are increasing control, flexibility and autonomy on a workday; promoting respect for work-life balance and opportunity to focus on job areas that one is more efficient at; improving organizational culture, that is, alignment of stated leadership values with those of the employees and leadership actions; and providing social support groups in the work environment. “Targeting these drivers builds well-being by strengthening the hub of meaning, values and purpose,” West said.

Some individual strategies to combat burnout are identification of personal values, nurturing personal activities, not putting one’s life on hold until a target is achieved and internal reflection about one’s well-being.

System-level policies to promote physician well-being include actively supporting individual focused interventions such as self-care workshops and small group/community building around well-being and enacting structural interventions, such as shorter attending rotations.

Studies by West’s group at Mayo Clinic have shown that a small amount of protected time during the workday resulted in increased meaning from work and reductions in burnout. He also stressed that there should be a dialogue between management and employees on what interventions work best for the workforce. **R**

Study in Mice Identifies Type of Brain Cell Involved in Stuttering

Researchers believe that stuttering—a potentially lifelong and debilitating speech disorder—stems from problems with the circuits in the brain that control speech, but precisely how and where these problems occur is unknown. Using a mouse model of stuttering, scientists report that a loss of cells in the brain called astrocytes is associated with stuttering. The mice had been engineered with a human gene mutation previously linked to stuttering.

The study, which appeared online in the *Proceedings of the National Academy of Sciences*, offers insights into the neurological deficits associated with stuttering.

The loss of astrocytes, a supporting cell in the brain, was most prominent in the corpus callosum, a part of the brain that bridges the two hemispheres. Previous imaging studies have identified differences in the brains of people who stutter compared to those who do not. Furthermore, some of these studies in people have revealed structural and functional problems in the same brain region as the new mouse study.

The study was led by Dr. Dennis Drayna of NIDCD, in collaboration with researchers at Washington University School of Medicine in St. Louis, NIBIB and NIMH.

“The identification of genetic, molecular and cellular changes that underlie stuttering has led us to understand persistent stuttering as a brain disorder,” said Dr. Andrew Griffith, NIDCD scientific director. “Perhaps even more importantly, pinpointing the brain region and cells that are involved opens opportunities for novel interventions for stuttering—and possibly other speech disorders.”

Stuttering is characterized by pauses and repeated or prolonged sounds, syllables or words, which disrupt the normal flow of speech. People who stutter know what they want to say, but they have trouble saying it. The condition is most commonly seen in young children who typically outgrow the problem. However, for 1 in 4 children who experience early stuttering, the condition persists as a lifelong communication problem.

It is estimated that as many as 1 percent of adults in the United States are affected by stuttering.

“The brain imaging studies of people who stutter are important, but those results can only take us so far,” said Drayna. One challenge, he said, is that the imaging studies cannot decipher if

the differences contribute to stuttering or are an effect of stuttering.

“By taking a genetic approach, we have been able to begin deciphering the neuropathology of stuttering, first at the molecular level by identifying genetic mutations, and now at the cellular level,” he added.

Study Links Long-Term Exposure to Air Pollution and Emphysema

Long-term exposure to air pollution was linked to increases in emphysema between 2000 and 2018, according to a new study funded by NIEHS and NHLBI. Emphysema, usually associated with cigarette smoking, is a chronic disease in which lung tissue is destroyed and unable to effectively transfer oxygen in the body. The study is published in the *Journal of the American Medical Association*.



Scientists report that a loss of cells in the brain called astrocytes is associated with stuttering.

IMAGE: PIRANKA/GETTY

“These findings may offer one explanation for why emphysema is found in some people who never smoked,” said Dr. James Kiley, director of NHLBI’s Division of Lung Diseases. “The study’s

results, duration and timing offer insight into the long-term effects of air pollution on the U.S. population.”

The relationship between various air pollutants and emphysema was measured through computed tomography (CT) lung imaging and lung function testing. Consistent results were found in these varied metropolitan regions: Winston-Salem, N.C.; St. Paul, Minn.; New York City; Baltimore; Chicago; and Los Angeles. Participants came from the Multi-Ethnic Study of Atherosclerosis (MESA), a medical research study involving more than 7,000 men and women from the 6 localities.

“The combined health effect of multiple air pollutants—ozone, fine particles known as PM2.5, nitrogen oxides and black carbon—was greater than when the pollutants were assessed individually,” said Dr. Bonnie Joubert, a scientific program director at NIEHS. “With the study’s long-running duration, repeated CT scans allowed analysis of changes in emphysema over time.”

Researchers measured all major air pollutants with longitudinal increases in percentage of emphysema revealed by more than 15,000 CT scans acquired from 2000 to 2018. Over the same

period, MESA carefully tracked air pollution. MESA is unique in its meticulous characterization of air pollution exposures along with repeated CT scans of lungs in study participants.

Emphysema is a debilitating disease. People with emphysema have difficulty breathing, along with a persistent cough and phlegm. It makes physical and social activities difficult, creates work hardships and may result in detrimental emotional conditions. Its development can be a slow, lifelong process. Emphysema is not curable, but treatments help manage the disease.

“We need to assess the effectiveness of strategies to control air pollutants in our efforts to improve heart and lung health,” said Dr. David Goff, director of NHLBI’s Division of Cardiovascular Sciences. “At the same time, people need to remember the importance of a healthy diet, physical activity and tobacco smoking cessation for overall health.”

Enterovirus Antibodies Detected in Acute Flaccid Myelitis Patients

A new study analyzing samples from patients with and without acute flaccid myelitis (AFM) provides additional evidence for an association between the rare but often serious condition that causes muscle weakness and paralysis, and infection with non-polio enteroviruses. NIAID funded the research, which was conducted by investigators at Columbia University’s Center for Infection and Immunity and researchers from the Centers for Disease Control and Prevention. The findings are reported in the online journal *mBio*.

There have been 570 confirmed cases since CDC began tracking AFM in August 2014. AFM outbreaks were reported to the CDC in 2014, 2016 and 2018. AFM affects the spinal cord and is characterized by the sudden onset of muscle weakness in one or more limbs. Spikes in AFM cases, primarily

in children, have coincided in time and location with outbreaks of EV-D68 and a related enterovirus, EV-A71. Both of these viruses typically cause mild respiratory illness from which most people recover fully. Despite the epidemiological link between enterovirus circulation and AFM cases, evidence of direct causality has not been found.

While other etiologies of AFM continue to be investigated, this study

provides further evidence that enterovirus infection may be a factor in AFM. In the absence of direct detection of a pathogen, antibody evidence of pathogen exposure within the central nervous system can be an important indicator of the underlying cause of disease, the researchers note.



Long-term exposure to air pollution was linked to increases in emphysema between 2000 and 2018.

IMAGE: KODDA/GETTY



NEI director Dr. Paul Sieving has retired.

NEI Director Sieving Retires

Dr. Paul Sieving retired as NEI director on July 29. During his tenure at NEI, he spearheaded initiatives in genetics, data sharing and regenerative medicine.

When Sieving arrived at NEI in 2001, science was at a turning point, with recent sequencing of the first human genome. Under his direction, NEI created key resources that enabled researchers to employ new technologies in genetics, neuroscience and imaging.

In 2002, NEI created the Diabetic Retinopathy Clinical Research Consortium to link academic research centers and community clinics. DRCR.net has thus far run more than 30 clinical trials. In 2006, NEI created eyeGENE, a genomic medicine initiative for rare inherited eye diseases that is a public-private partnership between the federal government, molecular diagnostic laboratories, academic institutions, individuals with inherited eye disease and their physicians.

The eyeGENE network includes a patient registry and a database with participants' ocular disease-related genetic information linked to their clinical phenotype. This information is also linked to biological samples in the eyeGENE Biorepository. There are approximately 30 ongoing research studies utilizing this data and material. Concurrently, clinical trials at NEI yielded information crucial for treating common eye diseases such as age-related macular

degeneration and conditions such as amblyopia. Recently, NEI-funded research led to an FDA-approved gene therapy for the genetic eye disease Leber congenital amaurosis and a retinal prosthesis that can generate some functional vision.

Sieving's signature achievement is creation of the Audacious Goals Initiative in Regenerative Medicine (AGI), a research initiative that spurs development of regenerative therapies for vision loss. Powered by collaborative consortia, AGI research teams are developing imaging technologies and translational animal models and are uncovering protein and gene regulation networks—work crucial for future regenerative therapies.

"At NIH, Paul proved himself to be the consummate physician-scientist-administrator who strengthened and led an outstanding research program to advance vision health," said NIH director Dr.

• • •

"Paul proved himself to be the consummate physician-scientist-administrator who strengthened and led an outstanding research program to advance vision health."

—NIH DIRECTOR DR. FRANCIS COLLINS

• • •

Francis Collins in a statement announcing Sieving's retirement.

Sieving is recognized for his groundbreaking research of the rare genetic disease X-linked retinoschisis. He and colleagues determined the genetic and molecular underpinnings of the disease, culminating in the first-ever gene therapy trial for the condition at the Clinical Center in 2018, which is still ongoing.

Sieving will continue his work on X-linked retinoschisis at the University of California, Davis, where he will direct a new Center for Ocular Regenerative Therapy. While NIH conducts a national search for a new director, Dr. Santa Tumminia will serve as acting director of NEI. She has been at NEI for more than 20 years and has served as deputy director since 2018.

Vanderpool Named NCI Branch Chief

Dr. Robin Vanderpool has been named chief of the Health Communication and Informatics Research Branch in the Division of Cancer Control and Population Sciences at the National Cancer Institute.

The branch, part of the Behavioral Research Program, leads the advancement of research on processes and outcomes of communication and consumer health informatics across the cancer control continuum. Vanderpool will lead the development of health communication research initiatives in areas such as patient-provider communication, cancer risk communication, health literacy, social/new media and connected health.

Vanderpool's research background includes HPV vaccination, cancer screening, cancer survivorship, implementation science and rural cancer control.

"Robin's extensive experience in a broad array of cancer control issues and partnerships will be a great asset to NCI and constituencies," said Dr. Bob Croyle, DCCPS director.

Vanderpool comes to NCI from the University of Kentucky, where she was a professor in the department of health, behavior & society, part of the College of Public Health. She also held leadership positions at the University of Kentucky Markey Cancer Center, as associate director for community outreach and engagement and co-director of the Behavioral and Community-Based Research Shared Resource Facility.

Vanderpool earned her doctorate of public health, with a concentration in health behavior, from the University of Kentucky. She received her masters of public health in public health education from Western Kentucky University and her bachelor of science in psychobiology from Centre College.



Dr. Robin Vanderpool



Seated (from l) are science fair winners Nikita Rohila, Sid Thakker and Aditya Tummala. Standing are (from l) NIDA deputy director Dr. Wilson Compton; family members Suman Rohila, Sanya Thakker and Sheetal Thakker; Friends of NIDA's Dr. Charles O'Keeffe; family member Hemachand Tummala; retired NIDA communications chief Carol Krause; and NIDA chief of staff Dr. Jack Stein.

NIDA Hosts Winners of Addiction Science Awards

The winners of NIDA's 2019 Addiction Science Awards, part of the Intel International Science and Engineering Fair (ISEF), presented their projects to NIDA deputy director Dr. Wilson Compton and other NIDA scientists on Aug. 12.

Following the presentation, the awardees toured the NIH campus and NIDA intramural program. The Addiction Science Awards are coordinated by NIDA as well as Friends of NIDA, a private group dedicated to furthering NIDA's mission. ISEF is the world's largest science competition for high school students.

First place went to Aditya Tummala from Brookings High School in Brookings, S. Dak., for his project "Tampr-X: A Novel Technology to Combat Prescription Opioid Abuse." The young scientist recognized the need for an improved tamper-proof opioid pill to reduce potential for misuse and developed a gummy-like substance that could not be crushed or melted for snorting or injecting. Called Tampr-X, the product has a provisional patent.

Second place went to Sid Thakker from James Madison High School in Vienna, Va., for "The Role of ALPHA5 Single Nucleotide Polymorphism on Nicotine Dependence." Using an *in vitro* model, the 15-year-old manipulated and edited the gene expression of the ALPHA5 nicotinic receptor, which has been linked to nicotine addiction. His hope is that one day we can discover how to conduct this genetic editing in animals, leading to new therapies in humans.

Winning third place was Nikita Rohila of Stuttgart High School in Stuttgart, Ark., for her project "Trends and Factors for Risky Behavior Among Adolescents." The 15-year-old sophomore developed a survey to identify trends and factors in the risk-taking behaviors and decision-making skills of nearly 100 teens, 14-18 years old.

VRC Needs Healthy Volunteers

Vaccine Research Center researchers seek healthy volunteers, 18-50 years old, for a study evaluating an investigational vaccine that targets HIV. Compensation is provided. There is no risk of infection. To learn how to participate, call 1-866-833-5433, email vaccines@nih.gov or visit <http://bit.ly/VRC-018>.

Patients with Fanconi Anemia Needed

NHLBI researchers need volunteers at least 4 years old with Fanconi anemia to participate in a study investigating a treatment to improve blood counts. Compensation for travel is provided. Study-related tests are provided at no cost and results are shared with you and your doctor. Call 1-866-444-2214 (TTY 1-866-411-1010). Read more at <https://go.usa.gov/xQyKp>. Refer to study 17-H-0121. Se habla Español.

Volunteers with Leukemia Sought

NHLBI researchers need volunteers with CLL (chronic lymphocytic leukemia) or small lymphocytic lymphoma (SLL) for a new investigational treatment study. Researchers are adding pembrolizumab (an immunotherapy agent) to standard treatment. If you have received treatment for CLL and progressed or have high-risk genetic changes such as deletion 17p, TP53 mutation, NOTCH1 mutation or complex cytogenetics, you may be interested in participating. To learn more, call 1-866-444-2214 (TTY 1-866-411-1010). Read more online at <https://go.usa.gov/xnYae>. Refer to study 17-H-0118.

Study Needs Healthy Volunteers

NINDS researchers seek healthy volunteers for an outpatient research study. The purpose of this study is to understand more about how the brain controls motor function. Volunteers may receive brain, skin and nerve stimulation and may perform tests of hand movement, behavior and learning (some tests may be done during an MRI scan of the brain). Volunteers may be scheduled for between 1-20 sessions. Sessions will be of various durations, lasting up to 8 hours each. There is no cost for research-related procedures or participation. Compensation is provided. For more information, call 1-866-444-2214 (TTY users call via MD Relay 7-1-1) or email prpl@cc.nih.gov. Refer to study 07-N-0122. Read more at <https://go.usa.gov/xPRWT>.



Emily Otterbacher and her son Cole

Patient's Mother To Run Marathon for Inn

BY ERIC BOCK

When Emily Otterbacher first brought her son Cole to NEI's Eye Clinic, staff told her, "This is where you belong. We're going to get a diagnosis for you. You're in the right place."

The statement reassured Otterbacher. Until that point, her son's doctors in Annapolis were puzzled by his symptoms. Shortly after Cole was born, she noticed his eyes involuntarily ticking back and forth, a condition known as nystagmus.

Cole's pediatrician thought the condition would improve as the boy's eye muscles developed. By the time he was 5 months old, the ticking hadn't improved, so Otterbacher took her son to a pediatric ophthalmologist for a second opinion. He couldn't make a diagnosis, so he referred Cole to NEI and told her, "If anyone can figure it out, it's going to be the NEI."

Led by Dr. Brian Brooks, chief of NEI's unit of genetic and developmental eye disease, Cole's team diagnosed him with congenital stationary night blindness, a rare genetic disorder. Those with the condition have difficulty seeing in low-light situations. Nystagmus is one of the primary symptoms.

When Cole goes into a dark room, Otterbacher explains, his big brother, Landon, helps him by reaching for light switches.

"Cole is remarkable. He doesn't let his

diagnosis slow him down," she said. "Most people wouldn't know he has any problems besides wearing glasses."

This year, Otterbacher is part of the Children's Inn at NIH's #RunINN4Kids Marine Corps race team. On Oct. 27, she'll run the Marine Corps Marathon, a 26.2-mile race that passes by some of the most recognizable landmarks in Washington, D.C., and Arlington, Va. To join the team, runners must raise at least \$600 for the inn.

She learned about the inn during one of her son's visits to the eye clinic. She looked out the window and saw the inn's "amazing" playground. Although Cole is an outpatient, the inn welcomed him.

"We can take Cole there if he needs a break or after a day of tests," Otterbacher said. "He can play on the playground or take a nap."

Otterbacher has met other families through the inn and NEI. She shares with them the feeling that "you never, ever want anything wrong with your child. There are a lot of questions and uncertainties."

She added: "Even if there are different



The Otterbacher family

things wrong with our children, there's that 'our-kid-has-something-rare' connection. It's scary and frustrating sometimes, but we all wound up here together, which is nice."

The marathon will be Otterbacher's fifth. She has always been a runner. But after her son was born, she began running longer distances as an outlet. So far, her training has been going well. Her goals are to get faster, stronger and to be injury-free at race time.

Her husband James's support has allowed her to follow a training regimen.

"Marathon training takes a lot of time and he's super supportive through all of it," she said. "Every single weekend, I have to wake up early and go for a long run."

Running the race for the inn is a "no brainer," Otterbacher explained. The inn "isn't a random charity. It means a lot to us." **B**

Webinar on 'Geospatial Data for Healthy Places,' Sept. 19

The Office of Disease Prevention will hold a Methods: Mind the Gap webinar with Dr. Harvey J. Miller on "Geospatial Data for Healthy Places:



Dr. Harvey J. Miller

Building Environments for Active Living Through Opportunistic GIScience." It will take place on Thursday, Sept. 19 at 11 a.m.

A healthy community requires a built environment that encourages physical, mental and social well-being. Few neighborhoods and communities in the

United States—and increasingly elsewhere in the world—are healthy places.

Miller will discuss the role of geospatial technologies and data in facilitating quasi and natural experiments about built environment factors that encourage active living.

Miller is the Bob and Mary Reusche chair in geographic information science, director of the Center for Urban and Regional Analysis and professor of geography at Ohio State University. He also chairs the mapping science committee of the National Academies of Sciences, Engineering and Medicine.

Registration is required, at <https://prevention.nih.gov/education-training/methods-mind-gap/geospatial-data-healthy-places-building-environments-active-living-through-opportunistic-gisience>. The webinar will be recorded and available on the ODP website within about a week.