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SOULS, FOOD

NLM Exhibit Provides Backstory, Complexity to What We Know About Slavery

BY CARLA GARNETT

By about 4:30 a.m. every day, two colonial-era cooks—Nathan and Lucy, both slaves—were well into their typical work day on Mount Vernon plantation near Alexandria, Va. We know from historical record that a cook’s duties would have included lighting fires in the kitchen hearth for breakfast prep, and perhaps in the dining room for warmth of those seated to eat. We know what routine morning meals might have included—some kind of freshly baked bread, certainly a hot drink. We even



Dr. Psyche Williams-Forsen talks food and freedom in an NLM lecture.

PHOTO: BILL BRANSON

know favorite foods of homeowner George Washington—he was partial to a drink/broth he called “mint water.” But what else do we know about Nathan and Lucy? And what insight on the period might research on food provide?

“Even as you arise and go about your day, start your commute, you’re bringing with you your histories, your traumas, your

SEE **FOOD**, PAGE 6

PROBABILISTIC MEDICINE

How ‘Big, Messy Data’ Can Guide Psychiatric Treatment

BY DANA TALESNIK

Psychiatry is an inexact science. Sometimes doctors must make educated guesses based on limited data.

This scenario happened to Boston psychiatrist Dr. Roy Perlis, whose research focuses on treatment-resistant mood disorders. Frustrated after his lab’s large genomics studies failed to identify depression genes, Perlis began thinking outside the biomarker box.



Dr. Roy Perlis

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Native American scholars mark month, p. 12.

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In the Economy of the Cell, Metal Is Money

Changes in the availability and cost of commodity metals such as copper, zinc and iron are fundamental indexes in the U.S. economy and are just as fundamental to the economy of the cells in our body. Without these metals, none of our cells can live or replicate, said Dr. Thomas O’Halloran at this year’s



Dr. Thomas O’Halloran

DeWitt Stetten Jr. Lecture on Oct. 19.

Since the late 1980s, O’Halloran, a professor of inorganic chemistry at Northwestern University, has been among the few life

SEE **METAL**, PAGE 4

NIH Honors Veterans’ Sacrifices at Ceremony

BY ERIC BOCK

NIH honored the sacrifices of veterans from five armed service branches and the Public Health Service Commissioned Corps at the 2016 NIH Veterans Day Celebration. The event was held Nov. 9 in Kirschstein Auditorium, Natcher Bldg.



FAA’s Annie Andrews

The celebration featured talks by NIH principal deputy director Dr. Lawrence Tabak and a decorated Navy veteran who now works for the Federal Aviation

SEE **VETERANS**, PAGE 2



At left, the Table of Remembrance ceremony honors service members who are no longer with us. At right, NIH principal deputy director Dr. Lawrence Tabak honors veterans at NIH. He noted that NIH's history traces back to the 1887 creation of the Laboratory of Hygiene, part of the Marine Hospital in New York.

PHOTOS: ERNIE BRANSON

Veterans

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Administration. The event also included a remembrance honoring service members who are no longer with us.

Tabak thanked veterans and their families for their tremendous sacrifices to preserve our freedom. He noted that NIH employs 969 veterans—58 of whom have a disability.

“Our agency has a historic and unique tie to the armed forces dating back to the 1887 creation of the Laboratory of Hygiene for bacteriologic investigation at the Marine Hospital on Staten Island,” he said.

The hospital was part of the Marine Hospital Service, which was the predecessor to the PHS. Today, Tabak said, PHS Commissioned Corps officers remain important members of the NIH family, contributing to vital research efforts.

“We actively recruit veterans because we value the skills and vision that veterans bring to our workforce,” he said.

Navy Rear Admiral (ret.) Annie B. Andrews gave the ceremony’s keynote address. After 32 years in the Navy, she is currently the FAA’s assistant administrator for human resource management.

She said the FAA mission is to provide “the safest and most efficient aerospace system in the world.” That means protecting 785 million passengers each year. In addition, FAA now regulates commercial space transportation and unmanned aircraft

systems—also known as “drones.”

To fulfill its mission, the FAA needs engineers, computer scientists, business analysts and more. And that’s where Andrews comes in. It’s her job to attract and retain the best-qualified employees, many of whom are veterans. Of the 45,000 FAA workers, more than 15,000 are veterans.

“The FAA hires more veterans than any other agency except for the Department of Defense,” she said.

Andrews said veterans are mission-driven, committed, resourceful, creative, flexible and innovative. They can also solve problems and think on their feet.

“Veterans Day isn’t just a day for veterans,” Andrews concluded. “It’s a day for all Americans. It’s a day to remember past struggles.”

Before Tabak and Andrews spoke, veterans from the Navy, Army, Coast Guard, Air Force and Marines took part in the Table of Remembrance ceremony—the tradition of setting an empty table to honor fallen, missing or imprisoned military service members.

The NIH Veterans Day Celebration was organized by the NIH veteran recruitment and retention force in partnership with the Office of Human Resources. **R**

Open Enrollment for NIH Leave Bank

Open enrollment for the 2017 NIH Leave Bank is currently under way and will end on Dec. 12. Enrollment is open to all NIH federal employees. The membership period will begin on Jan. 8, 2017.

The Leave Bank is a pooled bank of donated annual and restored leave available to eligible members. The program acts like an insurance policy for your paycheck and amounts to paid leave for members who have exhausted all of their leave and are affected by a personal or family medical emergency.

“Being a member of the leave bank saved my family financially,” said one enrollee. “Although I had to exhaust my leave, I didn’t have to worry about my income as I knew the leave bank would be there for me to draw from. During this type of emergency, the last thing you want to worry about is how you are going to pay the bills should you run out of leave.”

To become a 2017 member, access ITAS during open enrollment and choose “Leave Bank Membership.” If you are currently a 2016 Leave Bank member, your membership will automatically continue into 2017, unless you opt out.

For each membership year, there is a contribution requirement. The annual membership contribution is one pay period’s worth of annual leave accrual (4, 6 or 8 hours). If you don’t have the needed accrued leave, you can still join. The membership contribution will automatically be waived.

More information about this benefit can be found at <http://nihleavebank.od.nih.gov>. Questions may be directed to the NIH Leave Bank office at (301) 443-8393 or LeaveBank@od.nih.gov.

NIH Library Hosts Bibliometrics Symposium

One of the largest bibliometrics conferences in the U.S. was held Oct. 31 and Nov. 1 at NIH. Nearly 200 people from libraries and organizations across the U.S. and around the world attended the Bibliometrics and Research Assessment Symposium, co-organized by the NIH Library and the Maryland chapter of the Special Libraries Association.

Bibliometrics, the quantitative analysis of published research, is increasingly being used at NIH and in global organizations to explore and evaluate scientific research using publications as a proxy for research.

Keynote speakers Dr. Ludo Waltman, researcher with the Centre for Science and Technology Studies, Leiden University, The Netherlands, and Dr. Katy Börner, professor of information science at Indiana University, presented their talks in the Clinical Center's Lipsett Amphitheater. They discussed current trends in the fields of bibliometrics and research assessment on the first day of the symposium. The remainder of the day included a poster session on the FAES Terrace and a lively group discussion. The second day was devoted to a hands-on workshop on bibliometric tools and techniques.

In his talk, Waltman articulated the differences between citizen and professional bibliometrics. After presenting a simplistic model of what citations measure, he delved into citation analysis challenges and proposed solutions. Issues that were covered—details of which can be reviewed in the archived videocast—included skewness of impact factors, inconsistencies surrounding indicators such as the h index and scientific field normalization when conducting analyses.

Börner introduced the audience to data visualization literacy. Through the display of several intriguing data maps, she discussed how data can be visualized relevant to information needs as well as tools to use for specific types of analysis. Also discussed were graphic variable types versus graphic symbol types and descriptive models. Among the slides shown were visual depictions of Börner and her co-researchers' findings on



Shown (from l) are keynote speakers Dr. Katy Börner and Dr. Ludo Waltman, along with NIH Library informationists Christopher Belter and Dr. Ya-Ling Lu. They stand in front of the data visualization screen while visiting the NIH Library following the bibliometrics symposium.

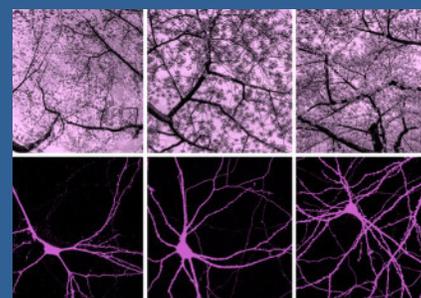
PHOTO: KATHLEEN MCGLAUGHLIN

the win-win of long-distance interdisciplinary collaboration for citation impact.

The NIH Library, located in Bldg. 10, provides innovative information services that help advance NIH's mission. The library's Bibliometrics Services Program provides both a standard suite of services to all of NIH and custom services to individual ICs and programs in response to their specific needs. These include consultations, training on bibliometric theory and practice and customizable analyses of publication portfolios and research areas.

"The Bibliometrics and Research Assessment Symposium was just one of the library's initiatives to advance scholarly communication and bibliometric practices at the NIH," said NIH Library director Dr. Keith Cogdill. "We are pleased about the support that informationists Chris Belter and Dr. Ya-Ling Lu have been able to provide to NIH in the form of bibliometric analyses and look forward to their continued involvement in this arena."

To find out how the NIH Library can assist your group, or to schedule a bibliometrics consultation, contact Belter (christopher.belter@nih.gov) or Lu (ya-ling.lu@nih.gov). 



ON THE COVER: *Cherry blossoms and neurons*. 2016 CFC Beauty of Science 3rd place entry by NINDS

IMAGE: NATHANAE LEE, NINDS

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Turning Discovery Into Health

Metals

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scientists exploring substances that are not, technically, alive.

“Because the definition of inorganic means ‘not living,’ we have a bias to relegate inorganic molecules to subordinate roles in biology,” he said. But inorganic chemistry is poised to make major new contributions to our understanding of human health and disease, said O’Halloran, especially in the areas of developmental biology and what leads to senescence or apoptosis in cells.

“The periodic table of the elements is a type of ‘Rosetta stone’ for understanding the building blocks of the universe; approximately a quarter of the known elements are essential for life,” said O’Halloran. “Cells cannot create or destroy elements, so the supplies and allocations of those that are essential must be diligently managed by the cellular machinery.

“These essential metals must be accrued to high levels in a cell before it can divide,” O’Halloran has found. “These are hardly trace substances at all.”

Sophisticated new technology permits researchers to count how many metals there are in small compartments of a cell. “It still floors me today,” said O’Halloran, how dependent all kinds of living cells are—from bacteria to comparatively large mammalian egg cells—on iron and zinc alone.

Scientists can now tell when a cell is ready to divide by measuring changes in subcellular metal composition, said O’Halloran. “This ‘inorganic fingerprint’ is a kind of signature for cell function.”

When he first entered the field, O’Halloran studied cells that are able to sense the presence of mercury. “Cells don’t like it, and bacteria evolved early warning systems to detect it,” he said. He discovered the family of proteins that act as metal sensors capable of turning off and on the expression of genes that eliminated the threat.

Further, he and his collaborators discovered another family of proteins—the metallochaperones—whose role is to bring metal to the proper address inside cells. “Ideas are still erupting” in the field of metal trafficking within cells, he said. In Wilson’s disease, for example, the excess buildup of copper that is a hallmark of the disease can

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“I don’t care about sperm, but if you tell me that zinc is doing something special in the egg, we can talk!”

—PROF. TERESA WOODRUFF

★ ★ ★

be addressed with sulfur compounds that block copper’s negative effects.

Metals’ most dramatic role within cells involves fertility, said O’Halloran. Exhibiting the active function of the Irish wit gene, he recounted a walk on the beach with his wife, Prof. Teresa Woodruff, a reproductive biologist who studies mammalian egg development. He tried to explain the sudden buildup of zinc that occurs when a sperm cell—“one of the smallest cells in the body”—encounters the comparatively massive egg cell, the body’s largest.

“I don’t care about sperm, but if you tell me that zinc is doing something special in the egg, we can talk!” she said.

Together, O’Halloran and Woodruff have found that, during the 20-hour window when an egg cell is ready to be fertilized or perish, the number of zinc atoms increases by 20 billion, a 50 percent bump up. Then once the sperm cell meets oocyte, zinc is released in a so-called “zinc spark” that might rightly

be regarded as the spark of life. The number of zinc ions then goes back down. Both the zinc uptick and the subsequent downbeat are critical steps at this time in development.

Together, the team created a new kind of electron microscope capable of detecting zinc sparks and has proven their existence. Such basic biological investigation may one day help answer the question “What makes a good egg?” he said.

“We can improve *in vitro* fertilization if we have the ability to quantitatively define what it means to be a good egg,” said O’Halloran. “The intensity of the zinc spark is a positive sign. It is a hallmark of human egg maturation and the intensity correlates with successful progression to the blastocyte stage.

“This is a really exciting time,” he concluded. “Metal fluxes are emerging not only as key events in developmental biology but also in the battleground between host and pathogen in many diseases.”



Cell division depends on the availability of metals, said O’Halloran, in his recent Stetten Lecture.

PHOTOS: ERNIE BRANSON

Nanoparticles Adapted For Gene Delivery, Immunotherapy

Gene therapies could revolutionize medicine, including many forms of cancer treatment. For their potential to be realized, however, researchers must develop ways to prevent unintended immune responses and cell mutations. To achieve the benefits of gene therapy without negative side effects, NIBIB grantee Dr. Jordan J. Green develops biodegradable nanoparticles that can be biochemically engineered to carry therapies that can seek out and kill cancer tumors.

Green is associate professor of biomedical engineering, ophthalmology, oncology, neurosurgery and materials science & engineering at Johns Hopkins University School of Medicine. Last May, upon nomination by the National Institute of Biomedical Imaging and Bioengineering, he was one of 105 recipients of the Presidential Early Career Awards for Scientists.

Green visited NIBIB recently to describe his work developing gene therapies for treating cancer using biomaterials and nano-biotechnology techniques. His team has explored targeting cancer cells from the inside out, as well as from the outside in.

From the inside-out angle, Green's team seeks a biochemical route so that nanoparticles can selectively be taken up by cells. Libraries of biodegradable polymeric nanoparticles can be constructed for safe and effective intracellular delivery of nucleic acids, such as DNA, small-interfering RNA and micro RNA. In addition, these particles can be packaged with therapeutic biological molecules that can program immune cells. Green has found that small chemical changes cause big differences in the uptake of the nanoparticles. With chemical manipulation, his team is able to promote greater cytoplasmic delivery of the therapeutic particles into cells, which will hopefully result in more effective therapies.

"Sometimes polymers work a lot better in healthy cells and not the cancer cells, and sometimes we find they will work in both equally," Green said.

In studies of mice with the brain cancer glioblastoma, Green's team has shown that particular polymer structures increase the



Dr. Jordan J. Green, NIBIB grantee

efficacy of therapeutic gene delivery. "We see this specificity when we [study] the brain cancer cells and the healthy neural cells," Green said. "We get this specific

knockdown and cell death when we deliver RNA to trigger cell death of the cancer cells without killing the healthy cells."

Approaching the problem from the outside in—experimenting with the shapes of biomimetic micro-particles and nanoparticles used in the therapies—Green's group has compared the immune reaction generated by particles that mimic a type of cell called an antigen presenting cell. Those that are spherical don't seem to be as effective as those with varied contours. "Overall, what we're finding is that size and shape matter," Green said.

According to Green, the advanced bioengineering approaches that his team is developing have the

potential to impact not only cancer therapy, but also the fields of regenerative medicine, ophthalmology and immunology.—Raymond MacDougall **B**

Liu Named Deputy Director of CSR Division

The Center for Scientific Review has named Dr. Yujing Liu new deputy director of its Division of Receipt and Referral. He comes to CSR from the National Institute of Nursing Research, where he was chief of the Scientific Review Branch for the past 9 years.

"Dr. Liu has a warm, collaborative style that will be an asset in the division's many interactions with extramural applicants, NIH institute and center staff and other HHS agency officials," said DRR director Dr. Cathleen Cooper. "We are also pleased that he brings to CSR a broad NIH perspective and proven leadership skills."

In his new post, Liu will share responsibility for managing the division, work collaboratively with DRR's associate and assistant directors and serve as DRR's training coordinator, with responsibility for the trans-NIH receipt and referral 101 course and the DRR extended training program.

Liu received his doctoral degree in molecular genetics from Syracuse University. He did his postdoctoral training in human genetic diseases at the National Institute of Diabetes and Digestive and Kidney Diseases. He then joined the department of pediatrics at Georgetown University Medical Center, where he conducted research on animal models of human genetic disorders. His research focused on lysosomal storage diseases and neurodegenerative disorders. He also investigated angiogenesis by using mice models.

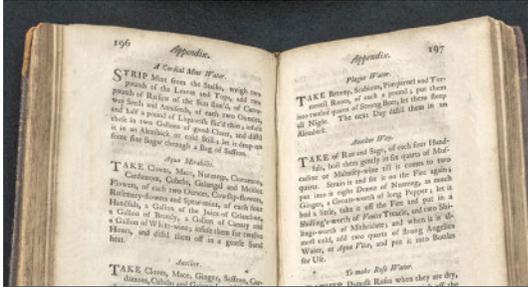
Liu came to NIH in 2000 to take a position in the Scientific Review Branch at the National Institute of Dental and Craniofacial Research. He then moved to the review chief position at NINR in 2007.



New Campus Child Care Center to Open in May 2017

The ORS Division of Amenities and Transportation Services has announced that the new campus child care facility, the Northwest Child Care Center (NWCCC), is expected to open in May 2017. Located between the Children's Inn and the NIH Fire Station, the center will serve 170 children from 6 weeks to 6 years of age.

There is, and will continue to be, a wait list for spaces in the NWCCC, as well as the other NIH-sponsored child care centers. Wait list registration begins Monday, Dec. 5. To sign up for the NWCCC or any other NIH-sponsored center, visit https://www.ors.od.nih.gov/pes/dats/childcare/Pages/waitlist_info.aspx. For questions about the center or NIH programs and services for families and children, visit <https://www.childfamilycare.ors.nih.gov> or call the child and family programs team at (301) 402-8180.



Images from *Fire and Freedom*. Above, a recipe for “A Cordial Mint Water” found in *The Compleat City and Country Cook: or, Accomplish’d Housewife...*, Charles Carter, 1732

IMAGE COURTESY NATIONAL LIBRARY OF MEDICINE
At left, a painting “George Washington and Family,” by Thomas Prichard Rossiter, ca. 1858–1860
IMAGE COURTESY THE MOUNT VERNON LADIES’ ASSOCIATION

Americans have used food and foodways practices not just for nourishment but also to resist white oppression—even when it meant using poison and theft.”

“Foodways,” Williams-Forsen explained, is a term used to describe the whole sustenance spectrum—from conceptualization to procurement to consumption, farm to table, so to

Food

CONTINUED FROM PAGE 1

creativities—all of the things that make you *you*,” explained Dr. Psyche Williams-Forsen in a lecture Nov. 3 introducing a recent exhibit at the National Library of Medicine. “How much more then would enslaved people do the same?”

Associate professor and chair of American studies at the University of Maryland, Williams-Forsen served as guest curator of “Fire and Freedom: Food and Enslavement in Early America,” a special display in the NLM reading room that aims to provide context—some backstories—to the bare-bones narrative many people have about the roughly 300 years in early American history when it was commonplace for humans to own other humans.

Plant the Seeds

In both exhibit and lecture, Williams-Forsen encourages viewers to think beyond stereotypes and traditional assumptions about food on an 18th century plantation in order to get a fuller appreciation of the times. “If meals tell stories,” she said, “what then can we learn about African-American cultures and lives and histories when we study food?...What we know about African-American food and foodways—and particularly African aspects of African-American culture—tends to follow one line of thinking. So it was part of my challenge to create an exhibit that went beyond the single story.”

Using documents from NLM’s History of Medicine Division, which produced the

exhibit over a 2-year period, along with artifacts and narratives from another local installation, “Lives Bound Together—Slavery at George Washington’s Mount Vernon,” Williams-Forsen and an exhibition program team wove more intricate plot lines and character studies into what is still a largely uncharted territory of our nation’s past.

Set the Table

“We’re at a time in society and certainly our local area where reclaiming African-American history is front and center,” said Williams-Forsen, author of the book *Building Houses Out of Chicken Legs—Black Women, Food and Power*.

“The stories detailing African-American food histories are long and complicated,” she continued. “They are about more than just the cook’s day—the labor of it all...I knew I had to tell the stories of toil, of dangers, of tensions, of celebrations, of triumphs, of creativity and ingenuity and more, even as I considered how the cooks would go about their day. More than a food culture that solely stems from scraps and offal, African

speak—shared by a particular group. The exhibit focuses on food events, she said, to communicate the relationship between food and identity, power, behavior and emotions.

“Many enslaved people also used food as a way to assert their humanity,” Williams-Forsen said. “They employed techniques that demonstrated a modicum of power even as it displayed cultural continuity, improvisation and ingenuity.” Of course “food was used to heal, to nourish,” she pointed out, but also to surveil, to plan, “to kill and even to escape.”

Assemble the Ingredients

On many a drafty night on the plantation, George Washington writes in a long-preserved journal, the eventual first president of the United States would call on another of his slave-cooks, an aged woman referred to only as “Old Doll,” to make mint water for him. Apparently Washington enjoyed a measure of the warm tea-like drink—a recipe for which was unearthed from NLM archives for the exhibit—as an elixir felt to ease a sore throat, upset stomach or indigestion.

In the NLM lecture, Williams-Forsen discussed the lives of survival endured by Old Doll and other slaves—particularly women—charged with preparing food for their owners. What were they thinking, feeling, saying to each other at the time?

“It’s really important when we talk about enslavement to think broadly about these conversations. Some of this is common sense, but because we’ve been told one narrative—the Middle Passage—we tend not to think about these nuances and we tend not to think of the gender dimensions.”



Portrait possibly of Mount Vernon slave-chef Hercules, attributed to Gilbert Stuart, ca. 1795–1797
IMAGE COURTESY MUSEO THYSSEN-BORNEMISZA/SCALA/ART RESOURCE, NY

Stir It Up

Williams-Forson traced black foodways back to their origins, to lay a foundation for plantation meals.

“African foods and livestock made their way to the Americas during the Middle Passage when Europeans stocked and restocked slave ships,” she said, citing the work of such fellow historians as Dr. Judith

Carney of UCLA. Plants and herbs such as tamarind, hibiscus flowers and cola nut came to U.S. shores as ship provisions, both to improve taste and fight diseases resulting from vitamin deficiency.

In addition, Williams-Forson said, slaves en route were “often fed forcibly,” according to notes by Thomas Trotter, a physician aboard the slave ship *Brooks*. The slave trade, she reminded, was after all a business that required keeping “cargo” alive and healthy for delivery to customers.

Women captives were essential; they were “needed to dress the victuals,” according to one slave ship captain in his journal. Williams-Forson said there’s more to learn about “the important role of women on slave ships.

Add Some Heat

“It’s more than just their labor,” she pointed out. “If women have access to the



Above, a chipped, rudimentary mixing bowl found at Mount Vernon is part of the NLM exhibition on food and slavery. At right, artist Eastman Johnson’s “Washington’s Kitchen, Mount Vernon,” 1864

IMAGES COURTESY THE MOUNT VERNON LADIES’ ASSOCIATION



food, then they also have access to weaponry [and other forms of power]. They know the movements and patterns of the slavers on the ship...It’s important to note this, because that means women also participated largely in the mutinies.”

Collecting material from a number of other scholars and historians, Williams-Forson was able to document other slave contributions to the New World’s foodways: African yams, plantains, Guinea peppers, pigeon peas, okra, black-eyed peas, rice, watermelon, peanuts and sesame seeds, as well as such food prep methods as stewing or slow-cooking, grilling, deep-frying and 1-pot meals.

Williams-Forson said, “Absence of familiar tools and ingredients meant enslaved people’s foodways had to merge with both Native and colonial peoples. Spices and herbs were introduced to disguise spoiled meats and to enhance flavor...local

grasses were used for medicinal purposes as much as for taste and variety.” Near former slave quarters, archaeologists also discovered rudimentary “colonoware”—hand-built, unglazed, locally made pots and pans.

Serve the Meal

On Feb. 22, 1797, Washington’s 61st birthday, a long-time slave named

Hercules, who the family had celebrated as an “artiste chef,” escaped from Mount Vernon—leaving behind children, grandchildren and more independence than most—never to be heard from again. Why did he run and why on that day?

“Early Africans’ lives were entangled in tensions and mired in trauma,” Williams-Forson said. “Food acquisition, preparation and consumption was also mired in trauma... [At Mount Vernon] you’re surrounded by water and yet...What must it have been like to see freedom and not be able to get to freedom? When you think about your own life and consider what it would mean having your movements restricted and surveilled and every day living under this constant psychological trauma, food takes on an entirely different meaning.”

To slaves, food embodied a lot more than sustenance, Williams-Forson concluded. Responsibility for feeding those who hold you in bondage required ingenuity, wits and survivalism and involved careful navigation of the power dynamic and demarcation of status.

“Freedom and food were inextricably linked because for some—and maybe even many African-American men and women—foodways were a major vehicle for the expression of culture or an identity,” she said. “This is due in no small part to the ways that food was stretched, augmented and made tasty and sustaining while filled with ritual and tradition...”

“‘Labor of love’—that’s often how we talk about cooking,” she noted, but consider it from a slave’s point of view. The full lecture is archived at <https://videocast.nih.gov/summary.asp?Live=19946&bhcp=1>. **R**

NLM’s ‘Fire and Freedom’ Exhibit on Display

THROUGH JAN. 13

The National Library of Medicine’s “Fire and Freedom: Food and Enslavement in Early America” will be on display to the public in the NLM History of Medicine Division reading room on the first floor of Bldg. 38 through Friday, Jan. 13. In addition, 50 cultural institutions across the country will host a traveling banner



version (shown at left) that NLM made available free of charge over the next 4 years. Find other places to see it in person at <https://www.nlm.nih.gov/hmd/about/exhibition/find-an-exhibition.html?exhibit=Fire%20and%20Freedom>. You can also visit an online adaptation at <https://www.nlm.nih.gov/exhibition/fireandfreedom/>.

Perlis

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“We’re always reasoning under conditions of uncertainty,” said Perlis, director, Center for Quantitative Health in Massachusetts General Hospital’s division of clinical research. “The genomics of psychiatric disease has turned out to be much harder than I think any one of us anticipated.”

Perlis, who also teaches psychiatry at Harvard Medical School, spoke at the NIMH Director’s Innovation Speaker Series at the Neuroscience Center on Oct. 26.

Faced with these challenges, Perlis and his collaborators wondered, “How do you get to personalized medicine when you can’t even find genes for a disease that affects 15-20 percent of the population?”

Beyond medicine, in recent years, personalization was plowing ahead in the tech world. Facebook launched targeted ads on news feeds based on collected data. Banks went a step further, acting on their trove of data by sending fraud alerts.

“The analogy in medicine would be, not only can we make guesses about how someone’s going to do over time, but also we need to be able to act on those predictions,” said Perlis. “It doesn’t do me any good if I can



Perlis says medicine needs to get comfortable with “big, messy data sets” in order to advance.

PHOTOS: ERNIE BRANSON

cases of depression and 200,000 healthy controls, they were able to identify 15 novel loci for depression and additional targets and pathways that are still under study. “This was validation for me that big, messy data sets can still be useful,” he said.

They then ascertained that respondents with more risk variants associated with depression also tended to have more

randomized controlled trials as our gold standard and they’re very good for certain things,” such as determining a drug’s effectiveness, Perlis said. “But if we’re going to develop more precise strategies for providing care for patients, we as a field of medicine need to get comfortable with using big, messy data sets,” or what he calls probabilistic medicine.

NIMH’s landmark STAR*D study treated 4,000 people with the antidepressant citalopram and then randomized treatments for patients who didn’t improve. “STAR*D made a major contribution to how we think about what to do when the first antidepressant doesn’t succeed,” Perlis said. “The question is, can we build on STAR*D without requiring another 5 years and tens of millions of dollars?”

To try to do so, his lab studied some 100,000 depression patients using only information from EHRs and learned that fewer than 10 percent who started antidepressants were ever prescribed an additional or different one. Currently, with collaborators at Harvard, his lab is trying to understand the factors that might guide decisions about next-step treatments for depression.

As a supplement to EHRs, his group also started looking at medical chart narratives—the notes written by doctors—to understand symptoms that might not appear in the diagnostic codes. They developed algorithms, such as natural language processing,

◆ ◆ ◆
“I’m afraid we use our aspiration to identify biomarkers as an excuse not to use the immediately useful clinical data that we have.”

—DR. ROY PERLIS



make a guess about something and not feed it back to the doctor or to the patient.”

So he started focusing on information they did have: electronic health records (EHRs), doctor’s medical notes, even simple surveys. “Six years ago, things were looking grim for genetic studies of depression. We couldn’t find genes; we didn’t know what we were going to do next,” said Perlis. “We had this crazy idea that we could map health systems using medical records and use that to build a biobank that would drive drug and biomarker discovery.”

First, his group partnered with 23andMe and Pfizer to use data from an online survey on depression history. Analyzing 75,000

symptoms and comorbidities such as anxiety, insomnia and obesity, confirming findings from large epidemiological studies. “This is not a replacement for doing large-scale biobank studies or large-scale case control studies,” Perlis emphasized. “This is a complement to those kinds of studies.”

In addition to surveys, another important resource for personalized medicine can be EHRs, which include diagnostic codes, demographics, prescriptions and other relevant patient data. This accumulated information can help assess mental health risk and shape health interventions, such as medicines to add or remove from a patient’s regimen.

“As a field, we are conditioned to treat

to search and view the narratives in an automated way. “Our traditional diagnostic system in psychiatry doesn’t capture a lot of the variations that are probably important in understanding these diseases,” Perlis said.

When combining EHR data with notes from natural language processing, Perlis and his team found they could build better risk models. These approaches also allow them to map psychiatric symptoms across large clinical populations, understanding symptoms where diagnoses overlap and where they’re different.

“Now, all of a sudden, we can make predictions about who’s at high risk for bouncing back into the hospital after discharge,” he said. Doctors can then try a range of interventions such as a medication or occupational therapy for higher risk patients or a phone call or web-based follow-up for lower risk patients.

Before embarking on time-consuming, costly studies, said Perlis, this methodology lets them look across the health system to assess risk and possible low-cost interventions. They can then re-contact certain patients of interest and at that point spend time and money on targeted studies to learn more about these populations.

“We can make good predictions now and we’re getting better at it,” said Perlis. “I’m afraid we use our aspiration to identify biomarkers as an excuse not to use the immediately useful clinical data that we have.”

At Mass General, with NIMH and NHGRI support, they have also developed a cellular biobank where they collect samples, study drug responses, conduct cognitive and psychological assessments and link to EHRs to assess the full range of medical illness. They’re studying how brain cells develop over time and connect to each other. They can then test the effects of different medications to try to understand the cellular abnormalities associated with brain diseases.

“We’re reaching a point where we have a first set of genes; now we have a set of model systems we can use to understand what those genes are doing,” said Perlis. “We have a whole health system we can use to understand what those variations look like at a population level. The hope is that we can go back in and try to use that same resource to try to find better interventions, not just make predictions about our existing ones.” 

NIH-Led Effort Examines Use of Big Data for Infectious Disease Surveillance

Big data derived from electronic health records, social media, the Internet and other digital sources have the potential to provide more timely and detailed information on infectious disease threats or outbreaks than traditional surveillance methods. A team of scientists led by NIH reviewed the growing body of research on the subject and has published its analyses in a special issue of the *Journal of Infectious Diseases*.

Traditional infectious disease surveillance—typically based on laboratory tests and other data collected by public health institutions—is the gold standard. But, the authors note it can have time lags, is expensive to produce and typically lacks the local resolution needed for accurate monitoring. Further, it can be cost-prohibitive in low-income countries. In contrast, big data streams from Internet queries, for example, are available in real time and can track disease activity locally, but have their own biases. Hybrid tools that combine traditional surveillance and big data sets may provide a way forward, the scientists suggest, serving to complement, rather than replace, existing methods.

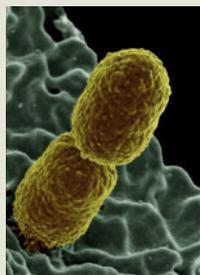
“The ultimate goal is to be able to forecast the size, peak or trajectory of an outbreak weeks or months in advance in order to better respond to infectious disease threats. Integrating big data in surveillance is a first step toward this long-term goal,” said Dr. Cecile Viboud, co-editor of the supplement and a senior scientist at the Fogarty International Center.

Rapid Screening Test Identifies Potential Therapies Against Drug-Resistant Bacteria

Researchers at NCATS, the Clinical Center and NIAID have created a new way to identify drugs and drug combinations that may potentially be useful in combating infections that are resistant to many different antibiotics. They developed a test to rapidly screen thousands of drugs to determine how effective they were against a variety of types of resistant bacteria.

The screening method provides a potential new approach to repurpose known drugs and compounds to potentially help deal with powerful, hospital-borne infections, as well as emerging infectious diseases.

NIH scientists used the test to screen approximately 4,000 approved drugs and other biologically active compounds, identifying 25



that suppressed the growth of two drug-resistant strains of *Klebsiella pneumoniae* that have become resistant to most major types of antibiotics. Drug-resistant *Klebsiella* has been a source of fatal infections in many hospitals across the country.

The researchers also used the screening test to gauge the effectiveness of combinations of drugs against antibiotic-resistant bacteria in this study. They found three different three-drug combinations that were effective against 10 common strains of multi-drug-resistant bacteria.

The results were published Nov. 9 in the journal *Emerging Microbes & Infections*.

The new screening test applies high-throughput screening technology to examine thousands of drugs and compounds that inhibit bacterial growth. The 25 newly identified drugs and compounds consisted of 11 FDA-approved drugs and 14 drugs still under investigation. They include antibiotics, antifungals, antiseptics and an antiviral, antimalarial and anticancer drug/compound.

“The results are very promising and we think that the test can eventually help repurpose approved drugs and other compounds and find clinically relevant drug combinations that can be approved for use in different ways that we have never used before,” said Dr. Wei Zheng of NCATS.

Testing of Inactivated Zika Vaccine in Humans Begins

The first of 5 early stage clinical trials to test the safety and ability of an investigational Zika vaccine candidate called the Zika purified inactivated virus (ZPIV) vaccine to generate an immune system response has begun at Walter Reed Army Institute of Research clinical trial center in Silver Spring. Scientists with WRAIR developed the vaccine.

The experimental ZPIV vaccine is based on the same technology WRAIR used in 2009 to successfully develop a vaccine for another flavivirus called Japanese encephalitis. The ZPIV vaccine contains whole Zika virus particles that have been inactivated, meaning that the virus cannot replicate and cause disease in humans. However, the protein shell of the inactivated virus remains intact so it can be recognized by the immune system and evoke an immune response.

NIAID partially supported the preclinical development of the ZPIV vaccine candidate, including safety testing and non-human primate studies that found that the vaccine induced antibodies that neutralized the virus and protected the animals from disease when they were challenged with Zika virus.

“We urgently need a safe and effective vaccine to protect people from Zika virus infection as the virus continues to spread and cause serious public health consequences, particularly for pregnant women and their babies,” said NIAID director Dr. Anthony Fauci.



Dr. Mona Trempe

PHOTO: SOMA CHOWDHURY

NIGMS Scientific Review Officer Trempe Retires

BY JILLIENE DRAYTON

Journeying from her NIH office in Bethesda to colleges and universities around the country was once a big part of Dr. Mona Trempe's life. In fact, she visited well over 100 colleges and universities during her 10-year career as a scientific review officer in the NIGMS Office of Scientific Review (OSR). "Site visits give you a broader view of the biomedical research and training activities taking place at our nation's institutions of higher education," she said.

Recently, Trempe packed her bags and set out for one last site visit—only this time her travel plans did not involve a return flight to Washington, D.C. She had just retired and was moving to Las Cruces, New Mexico.

Trempe's career path began as an undergraduate student at the University of Vermont, where she fell in love with science and earned a B.S. in chemistry. She went on to receive a Ph.D. in biological chemistry from the University of California, Los Angeles. Shortly after completing a postdoctoral fellowship in the biochemistry department at the University of Mississippi Medical Center (UMMC), Trempe took a faculty position there and went on to attain the rank of full professor.

During her tenure, she founded and directed the UMMC electron microscopy facility for imaging the three-dimensional shape of large protein complexes. An advocate for research training, Trempe mentored students who participated in the NIGMS Maximizing Access to Research Careers Undergraduate Student Training in Academic Research program. She also taught high school students from local communities in Jackson, Miss., how to conduct research in a laboratory setting.

"Mentoring students has been extremely important to me throughout my career, but I knew that I wanted to make a difference on a national scale rather than at the local level," said Trempe. To test the waters, she took a position through the Intergovernmental Personnel Act as a "rotator"

program officer in the division of molecular and cellular biosciences at the National Science Foundation in 2004. That experience convinced her to move full-time into research administration after two decades in research and teaching.

Trempe then joined NIGMS as a scientific review officer in 2006, where she managed the review of a variety of applications for research grants, cooperative agreements and training grants, including those designed to increase diversity in the research workforce.

Throughout her career, Trempe was known for assembling review committees that included people with diverse backgrounds and viewpoints. "Mona recruited a wide range of scientists with a breadth of perspectives for her review panels, including researchers with a strong commitment to teaching and mentoring the next generation of biomedical researchers," said Dr. Brian Pike, OSR acting director. "Her efforts were reflected in the quality and diversity of the programs that NIGMS supports."

In addition to her OSR duties, Trempe helped lead institute and NIH-wide committees and working groups. She served on the NIGMS strategic plan for biomedical and behavioral research training committee, the NIH working group on sustaining women in biomedical careers and the steering committee of the scientific review officer technical competency subcommittee.

Although Trempe's new residence is miles away from the NIH campus, she still plans to stay connected to and involved in the scientific community. "I eventually want to work in some capacity at a local college or university," she said. Along with settling into her new home with her husband, her retirement plans include studying Spanish, brushing up on her piano-playing skills and gardening.

"I'll now have a chance to learn about gardening plants that can survive in a much drier climate," said Trempe. "I imagine that will be a huge switch from the plants that thrive in the D.C.-area humidity, but I look forward to that change and to all of the new adventures that are ahead of me."



NIA's Dr. Creighton "Tony" Phelps retires soon.

Phelps To Retire After Almost Three Decades at NIA

BY ERIN CALHOUN

After nearly 30 years of federal service—all spent at the National Institute on Aging—Dr. Creighton "Tony" Phelps, deputy director of the Division of Neuroscience, will retire at the end of this year. He leaves the institute at a time when scientific opportunities and hopes for research on Alzheimer's disease and related

dementias have never been greater—a landscape his leadership helped create.

Phelps has worn several hats during his tenure at NIA, but it is perhaps his role as brain trust and director of the Alzheimer's Disease Centers (ADC) program that is likely to leave the longest and most effective legacy. The ADC network of research centers at major medical institutions across the country works to translate research advances into improved diagnosis, care and potential treatments for people with Alzheimer's disease. Under Phelps's leadership as director for more than two decades, the program has expanded to 31 centers nationwide.

"It's about more than just how many centers he's helped launch," said Dr. Eliezer Masliah, director of the Division of Neuroscience. "He has built a wonderful relationship with each and every center. ADC staff really trust Tony and value his feedback. He's been an invaluable asset that we, as well as the centers in particular, will truly miss."

Phelps also served as acting director of the Division of Neuroscience for 8 months in 2015-2016, at a critical time in management. Assuming the role just months after NIH was awarded an additional \$350 million for Alzheimer's disease and dementia research, he was instrumental in prioritizing new projects and research that are bringing us closer to finding a cure for these devastating conditions. His leadership ensured operations not only continued seamlessly, but also flourished during a period of major NIA growth.

"Our institute and the entire field of Alzheimer's research have benefited from Tony's leadership and scientific expertise," remarked NIA director Dr. Richard Hodes. "Building and strengthening some of NIA's flagship research programs and refining how we define Alzheimer's disease, he has helped usher in a new era of Alzheimer's disease research."

This new era includes an emphasis on data sharing and collaborative research. Phelps was instrumental in developing two centers that do just that—the National Alzheimer's Coordinating Center and the National Cell Repository for Alzheimer's Disease. Serving as program officer for both centers, Phelps championed sharing data, discoveries and even investigations with negative outcomes that nevertheless provide valuable insights.

Phelps also served as executive secretary to the aging review committee and program director in charge of the neurobiology and neuroplasticity portfolios within the Neuroscience and Neuropsychology of Aging Branch.

Titles may have changed over the years, but one thing has remained the same—a commitment to improving the rigor of Alzheimer's disease research. Phelps leaves NIA having made a remarkable and vitally important impact on the conduct of research not just in this field, but also in the fields of frontotemporal dementia, Parkinson's disease and other neurodegenerative conditions, said colleagues.

Srivastava Honored for Research in Pancreatic Cancer

Dr. Sudhir Srivastava, chief of the cancer biomarkers research group in NCI's Division of Cancer Prevention, was honored with the Distinguished Service Award from the American Pancreatic Association at the



Dr. Sudhir Srivastava

group's annual meeting in Boston in October. The award recognized his exemplary commitment to the field of pancreatology.

Pancreatic cancer is among the deadliest of the common cancers. It is the fourth-leading cause of cancer death in the U.S. More than 80 percent of patients present with incurable disease and the vast majority live for less than 12 months. Screening to detect precancerous lesions in asymptomatic individuals at increased risk may reduce mortality from the disease.

The award recognized the leadership role of Srivastava and the efforts of his team to establish the Pancreatic Cancer Detection Consortium for conducting research to improve the detection of early stage pancreatic ductal adenocarcinoma and characterization of its precursor lesions; establish a clinical consortium composed of a coordination and data management center and clinical centers to conduct studies on chronic pancreatitis (CP) and factors that increase the risk of pancreatic cancer in children and adults with CP, pancreatogenic diabetes and in patients with newly diagnosed diabetes; and establish a consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer Clinical Centers.



Dr. Molly Przeworski
PHOTO: ERNIE BRANSON

'Recombination Hotspots' Illuminated

Dr. Molly Przeworski, a professor of systems biology at Columbia University, spoke Nov. 17 in Lipsett Amphitheater on more than a decade of work on how genetic recombination—the merging of parental contributions—functions and how it completes the

slow, steady work of evolution. Focusing on mice, men and birds, her talk illuminated the discovery of "recombination hotspots" in the genomes of various species. "Everyone in this room is related, if you go back far enough in time," she said. **R**

Have a question about some aspect of working at NIH? You can post anonymous queries at <https://nihrecord.nih.gov/> (click on the Feedback tab) and we'll try to provide answers.

Feedback: The condition of the stairwells and hallways in parts of Bldg. 10 are in poor shape. The walls and floors are stained, dirty and dusty. The stairwell on the D corridor doesn't look like it has been painted in many years. The long corridor that leads to the cafeteria on the B1 level is also nasty. MLP-9 is also in need of a cleaning. The dust in the stairwells and on the window sills is at least 3 inches thick.

I would think that a place like NIH that receives many visitors would provide a cleaner environment for [its] employees and visitors. Is there a contract in place for the cleaning and upkeep of these areas?

Response from the Office of Research Facilities: Thank you for your comments regarding the condition of NIH buildings. Unfortunately, NIH has a backlog of maintenance and repair of over \$1.8 billion. This requires us to triage repairs and maintenance efforts. Architectural features, while highly visible, are not always a high priority, since the underlying mechanical, electrical, plumbing, elevator and fire protection systems are responsible for the highest risks, such as fires, floods, power outages, elevator outages and other high-consequence events.

The Office of Research Facilities, guided by the facilities working group, has developed an ambitious plan to recapitalize our facilities and has requested funding for this program. However, as you can appreciate, there is stiff competition for funds. One potential solution is that an institute/center could fund the common area improvements you've described, subject to certain appropriation law constraints, in a fashion comparable to "Adopt a Road" programs.

As to your question about areas that are in need of simple "cleaning and upkeep," NIH does hold a contract for housekeeping in the Clinical Center to address issues of general cleanliness. ORF will address your concerns about the MLP-9 parking garage. Recently, a routine, general sweeping of garage floors was completed. The cleaning of interior and exterior windows, light fixtures and elevator shafts is still ongoing. In Bldg. 10, the areas adjacent to the long corridor on the B1 level leading to the cafeteria are slated for renovation. As part of the renovation, improvements will be made to the corridor walls, including painting. If you see any other area in the building that has not been maintained properly, contact the ORF maintenance line at (301) 435-8000 and the issue will be promptly addressed. We agree the Clinical Center and all NIH facilities are destinations both visitors and employees should be proud of.

Feedback: Can you provide an update to phased retirement? The law passed in 2014 and HHS said a policy would be released in 2016.

Response from the Office of Human Resources: On Aug. 7, 2014, the Office of Personnel Management issued final regulations on phased retirement, and on Nov. 6, 2014, the final regulations took effect. Prior to participating in phased retirement and accepting applications, agencies must first take preparatory steps and develop an internal policy. Phased retirement is not yet available within DHHS. Once DHHS decides to adopt phased retirement, NIH must develop an internal policy for implementation procedures and complete the following:

- Discuss with our labor partners;
- Provide training to employees, managers and HR professionals; and
- Ensure that the department implements a phased retirement mentoring program necessary to fully comply with the regulations.

Upon the establishment of the HHS policy and the availability of the program to NIH employees, information will be disseminated via various communication sources such as NIH-wide listserv notices, the *Benefits Newsletter* and *HR News*.

Information on phased retirement may be viewed at <https://chcoc.gov/sites/default/files/Employment-as-a-Phased-Retiree-Q-and-A.pdf>.

Questions may be directed to your benefits contact or to AskBPLB@od.nih.gov. To locate your benefits contact, visit <https://hr.od.nih.gov/benefits/benefitscontacts.htm>.





Guests celebrate Native American Heritage Month with a round dance.

Native Scholars Celebrate Culture

PHOTOS: ERNIE BRANSON

In celebration of Native American Heritage Month, the NIH Native Scholars group, an informal gathering of trainees ranging from post-baccalaureate to postdoctoral fellows, treated their scientific and cultural mentors, as well as NIH dignitaries, to a traditional foods luncheon.

The eight Native researchers, representing seven different nations and garbed in traditional regalia of their tribe, hosted the meal. This was the third annual luncheon, and included traditional dishes such as red chile stew, dried elk meat with dried turnip and corn soup, hominy stew, green chile enchiladas, Wojapi (June berry pudding), Kabubu (pan bread), Indian ice cream (Buffalo berries), corn cake and Navajo tea.

Following the blessing, sung by Loretta Grey Cloud

of the Kul Wicasa Lakota and Hunkpati Dakota Nations, the Native Scholars introduced themselves, many in their Native language, and described the dish they had prepared as well as its significance to their culture.

Following the meal, Dr. Teresa Brockie, a post-doctoral fellow in the National Institute of Nursing Research, was honored by her mentee Grey Cloud and the other scholars including Dr. Tamara James (shown, l), a former fellow in NIDCR's Office of Science Policy and Analysis, with a handmade Pendleton blanket coat and an eagle feather. Following the blanket ceremony, Brockie led all the guests in a round dance to celebrate the day.



NINDS post-baccalaureate fellows Geanna Capitan and Alec Calac join in the annual celebration held in the Porter Neuroscience Research Center.



NIH tradition? Both affection and science are part of the festivities, as hugs, food and a poster session make their appearance.



NIH Native Scholars Celebrate 2016 Native American Heritage Month: Serving Our Nations. Shown are (from l) Dr. Tamara James, Choctaw Nation (former fellow in the NIDCR Office of Science Policy and Analysis); Tierra Robinson-Morgan, Piscataway Conoy (ORF post-baccalaureate fellow); Loretta Grey Cloud, Kul Wicasa Lakota and Hunkpati Dakota Nations (NIDCR post-baccalaureate fellow); Alec Calac, Pauma Band of Luiseno Indians (NINDS post-baccalaureate fellow); Dr. Teresa Brockie, A'aninin White Clay Nation (Clinical Center research nurse specialist); Geanna Capitan, Pueblo of Laguna and Navajo (NINDS post-baccalaureate fellow) and Dr. Rita Devine, NINDS assistant director for science administration.



Grey Cloud (l) introduces her traditional dish. She's joined by Robinson-Morgan and Capitan.