

November 2011

NIEHS Spotlight



[NIEHS holds community forum in LA](#)

The Oct. 6 forum was sponsored by NIEHS and the Southern California Environmental Health Sciences Center at the University of Southern California.



[NIEHS aids the global fight against indoor air pollution](#)

In a new commentary published by Science, NIH scientists outlined the dire need for governmental intervention in the fight against indoor air pollution.



[NIEHS trainees conquer dual-placement problem](#)

NIEHS trainees and husband-and-wife scientists Archana Dhasarathy, Ph.D., and Sergei Nechaev, Ph.D., secured tenure-track faculty positions together in North Dakota.



[NIH launches research program to explore health effects from climate change](#)

A new NIH-funded research program, led by NIEHS, will explore the role that a changing climate has on human health.



[New website brings environmental health to kids and classrooms](#)

Launched Oct. 3, the newly redesigned NIEHS Kids' Pages feature modern design, colorful graphics, and musical elements for science activities at home and at school.

Science Notebook



[Genomics Day showcases array and sequencing resources](#)

As powerful new technology generates ever-greater volumes of data, scientists need timely information about new resources and a network of support for using them.



[NIEHS workshop tackles erionite-linked disease risk](#)

Erionite may not be a household word in most of the world yet, but a first-of-its-kind U.S. workshop specifically on this issue Oct. 12 at NIEHS should help raise its visibility.



[Workshop confronts challenges of mixtures research](#)

The NIEHS "Advancing Research on Mixtures" workshop Sept. 26-27 marshalled leading experts to address the enormous challenge of assessing mixtures.



[Superfund study shows arsenic mitigation strategies effective](#)

Researchers found that water from deep wells in Bangladesh can be made safer from arsenic contamination by limiting how much water is pumped.



[Grollman takes top award at EMS meeting](#)

NIEHS grantee Arthur Grollman, M.D., received this year's EMS Award Oct. 18 at the Environmental Mutagen Society (EMS) 42nd Annual Meeting in Montreal.

NIEHS Spotlight



[Breast cancer panel moving forward, eyeing completion](#)

The committee, which has been empanelled since 2010 and is led by NIEHS in collaboration with NCI, met Sept. 26-27 at NIEHS.



[Training program celebrates 15-year investment in environmental justice](#)

Led by NIEHS Industrial Hygienist Sharon Beard, the webinar featured guest speakers from across the Minority Worker Training Program landscape.



[NIEHS grantees collaborate with NTP, FDA on BPA studies](#)

Twelve researchers received NIEHS funding this fall to work in collaboration with NTP and FDA to help develop state-of-the-art rodent studies on the chemical bisphenol A.



[Environmental toxicologist David Eaton elected to Institute of Medicine](#)

A professor and provost at the University of Washington, Eaton also directs the school's NIEHS-funded Center for Ecogenetics and Environmental Health.



[NIH issues LAB Challenge for K-12](#)

EHP Education and Outreach Program Manager, Bono Sen, Ph.D., is one of 12 NIH committee members issuing a groundbreaking, nationwide science education challenge.

Science Notebook



[EMS honors NIEHS-funded researcher](#)

The Environmental Mutagen Society has selected an NIEHS-funded study by Karen Huen, Ph.D., as its top publication of 2011 from a student or new investigator.



[Crystallography reveals roots of DNA repair-linked neurodegenerative disease](#)

Using X-ray crystallography, NIEHS researchers uncovered how a protein found in yeast and humans, known as aprataxin, recognizes and directly reverses DNA damage.



[High pesticide exposure associated with cognitive decline](#)

According to scientists at NIEHS, the University of Iowa, and the National Cancer Institute, accidental exposures during routine application may be a cause for concern.



[Collaboration yields important findings for lung function](#)

By combining two large genome-wide association studies, a team of researchers has found 16 new loci, or specific locations on genes, responsible for proper lung function.



[Stokes presents at international conference on animal models and drug testing](#)

NICEATM Director Rear Adm. William Stokes, D.V.M., discussed best practices in a talk presented during a conference at the New York Academy of Sciences Sept. 15-16.

NIEHS Spotlight



[Birnbaum addresses GSK women scientists](#)

NIEHS/NTP Director Linda Birnbaum, Ph.D., took her message of work/life balance to the GlaxoSmithKline Women in Science Annual Meeting Oct. 3 in RTP.



[NIH looks toward new opportunities for underrepresented minorities](#)

An Hispanic Heritage Month celebration Oct. 5 showcased a high-profile Hispanic scientist and marked the recent establishment of a SACNAS chapter at NIH.



[Hispanic health leader speaks at NIEHS](#)

NIEHS observed Hispanic Heritage Month Oct. 12 with a seminar by Jane Delgado, Ph.D., president and chief executive officer of the National Alliance for Hispanic Health.



[Students explore career opportunities at Superfund meeting](#)

Superfund Research Program trainees and postdocs had a rare opportunity to discuss their careers with NIEHS/NTP Director Linda Birnbaum, Ph.D., at this year's meeting.



[Foster named fellow of Academy of Toxicological Sciences](#)

Since 1981, ATS has awarded the title of fellow to certified toxicologists who are recognized by their peers for their expertise and sound scientific judgment.

Science Notebook



[NICEATM convenes international workshop on rabies vaccine testing](#)

More than 70 scientists from 14 different countries, representing government, industry, and academia, attended the workshop Oct. 11-13 in Ames, Iowa.



[New toxicology lab is joint effort of NCI and NIEHS](#)

In October, NIEHS/NTP Director Linda Birnbaum, Ph.D., announced the joint research endeavor between NCI and the NIEHS Division of Intramural Research.



[NIH announces funding opportunity for transformative research](#)

NIH will accept applications for 2012 NIH Director's Transformative Research Awards through Jan. 12, 2012, with letters of intent due Dec. 12, 2011.



[This month in EHP](#)

The November issue of EHP offers a timely examination of the controversy surrounding potential health impacts of mountaintop removal coal mining.



[Upcoming Falk lecturer Danny Reinberg](#)

The epigenetic biochemist will provide insights into epigenetics research with his talk on "Molecular Mechanisms of Epigenetic Inheritance."

Inside the Institute



[CFC charity fair and bake sale kick off 2011 campaign](#)

CFC volunteers followed up the campaign kick off with a book, music, and video sale; 5K run and 2-mile walk; and an ice cream social and a Halloween costume contest.



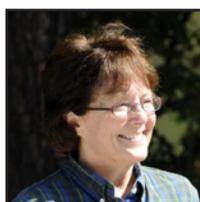
[Seminar highlights accommodations for the visually impaired](#)

NIEHS employees participated in an informal discussion about how technology has helped open doors in the workplace for people with visual impairment.



[BIG promotes wellness and community fellowship at annual fish fry](#)

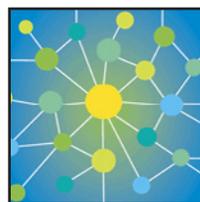
Blacks In Government welcomed members of NIEHS and several other government agencies to the NIEHS ball field for the annual BIG fish fry Oct. 6.



[NIEHS marks accreditation visit with sunshine and barbecue](#)

The NIEHS Comparative Medicine Branch thanked many others at the Institute for their hard work and dedication during the triennial accreditation evaluation.

Science Notebook



[Registration open for upcoming exposome workshop](#)

The workshop is the latest in a series organized by the Standing Committee on Use of Emerging Science for Environmental Health Decisions sponsored by NIEHS.

Extramural Research

[Extramural papers of the month](#)

- Smart management could mitigate risk of arsenic poisoning from wells
- Mutational signature for aristolochic acid
- Mechanism for green tea's health benefit
- Lead exposure and child development

Intramural Research

[Intramural papers of the month](#)

- Two point mutations may influence the efficacy of breast cancer treatment
- IL-35 production by regulatory T cells reverses allergic asthma
- New rank-based methodology useful for large-scale association studies
- Heat-Shock Protein 70 is an important regulator of O₃-induced lung inflammation

Calendar of Upcoming Events

- **Nov. 2**, in Rodbell Auditorium, 1:00-2:00 p.m. — Seminar on “The National Prevention Strategy,” by U. S. Deputy Surgeon General Rear Adm. Boris Lushniak, M.D.
- **Nov. 2**, in Rodbell C, 2:00-3:00 p.m. — Keystone Lecture Seminar Series with Valerie Hu, Ph.D., speaking on “An Integrative Genomics Approach Towards Understanding, Diagnosis, and Personalized Treatment of Autism Spectrum Disorders”
- **Nov. 3**, in Rodbell Auditorium, 8:30 a.m.-4:30 p.m. — NIEHS Science Day
- **Nov. 4 (offsite event)**, at the Washington Duke Inn in Durham, N.C., 8:30 a.m.-3:00 p.m. — Integrated Toxicology and Environmental Health Program Fall Symposium
- **Nov. 10**, in Rodbell Auditorium, 8:30 a.m.-4:30 p.m. — North Carolina Association for Biomedical Research Workshop
- **Nov. 15**, in Rodbell A, 11:00 a.m.-12:00 p.m. — Biostatistics Branch Seminar Series lecture on “*Ex-Vivo* Modeling for Heritability Assessment and Genetic Mapping in Pharmacogenomics,” by Alison Motsinger-Reif, Ph.D.
- **Nov. 15**, in Rodbell A, 2:00-3:00 p.m. — Keystone Lecture Seminar Series with Edward Puzas, Ph.D., speaking on “Bone, Brain and Fat: Is there a unifying principle responsible for multi-organ toxicity?”
- **Nov. 17-18**, in Rodbell Auditorium, 8:30 a.m.-4:30 p.m. — Peer Review of Draft NTP Monograph on Health Effects of Low-Level Lead
- **Nov. 29**, in Rodbell Auditorium, 11:00 a.m.-12:00 p.m. — Falk Lecture with Danny Reinberg, Ph.D., speaking on “Steps Towards Understanding the Phenomena of Epigenetics at a Molecular Level”
- View More Events: [NIEHS Public Calendar](#)

NIEHS Spotlight

NIEHS holds community forum in LA

By Eddy Ball

By all accounts, the NIEHS community forum in Los Angeles (LA) Oct. 6 exceeded expectations, as residents turned out to voice their concerns about air pollution. The forum was sponsored by NIEHS and the [Southern California Environmental Health Sciences Center](#) at the University of Southern California (USC).

Headed by NIEHS/NTP Director Linda Birnbaum, Ph.D., scientists and officials from NIEHS, grantees from USC and the University of California, Los Angeles (UCLA), and area government and nonprofit organizations gathered for a day of information sessions, a harbor communities' tour, and a well-attended community forum, "Traffic Pollution and Your Health." The busy schedule took the delegation to several sites along the transportation corridors stretching from Long Beach to East LA, where pollution from trucks, ships, trains, and other diesel-powered sources pose health concerns for residents and students in homes and schools adjacent to the docks and highways.

The NIEHS community forum was covered in a feature [article](#) by Environmental Health News (EHN) Editor-in-Chief Marla Cone about it, which also appeared in [Scientific American](#). Looking back on her experience as part of the NIEHS delegation, Legislative Liaison Mary Gant expressed the feelings of her colleagues when she said, "This was truly one of our best town meetings."

A firsthand look at traffic pollution

The visit began the morning of Oct. 6 with meetings between NIEHS representatives and area researchers supported by NIEHS air pollution, neurotoxicology, gene-environment interaction, and worker training and safety grants.

That afternoon, Birnbaum and the NIEHS delegation joined NIEHS-funded center investigators on a two-hour bus tour through San Pedro, Wilmington, West Long Beach, and along I-710 north to the city of Commerce.



The NIEHS delegation began its visit by meeting with grantees invited from USC, UCLA, and the California Institute of Technology. (Photo courtesy of John Schelp)



The ports are big and getting bigger, estimated to double within the next five years. People in the area live, work, learn, and play exposed to high levels of traffic emissions from nearby roads and docks. (Photo courtesy of John Schelp)

The tour included the two largest ports in the U.S., which are often described as the economic engine of Southern California with some 40 percent of the entire nation's goods transported through their facilities. Despite efforts to reduce emissions from the heavy volume of traffic, the rapidly growing ports are the largest single source of pollution in the multicounty South Coast Air Basin.

Hearing from the community

The visit came to its culmination later in the evening at the community forum at Progress Park Plaza in Paramount, Calif., where Birnbaum spoke, along with USC grantees Andrea Hricko, Ed Avol, M.D., and Frank Gilliland, M.D., Ph.D. A panel of officials from area government and nonprofit organizations helped field questions from the audience.

In her brief talk, Birnbaum described NIEHS-funded research in California, where the institute spent \$66 million on grants last year, nearly a third of it in the LA area. "Seeing what's going on in the community," she said of her tour earlier in the day, "it really struck home how important our efforts are to look at the environment and how it may influence the health of our children, our parents, and ourselves."

The audience of some 100 residents showed their concerns about the traffic volume, with hundreds of trucks traveling the Terminal Island Freeway each hour, and the effects of fine-particle air pollution on their health. Several mothers spoke about the high rates of asthma along the corridor.

While people at the forum wanted to hear about action, they were also grateful for the research funded by NIEHS to make the cause-and-effect relationship of pollution and health outcomes clearer for a stronger public health initiative. "I want to thank you for your research and your studies," said one community representative from Boyle Heights, a neighborhood east of LA. "That's the power we have."

(For additional photos of the grit and glitter of LA, view a slideshow by John Schelp, NIEHS Office of Science Education and Diversity posted [online](#). To navigate through the slides, click on the black space beneath each photo.)



A former nurse at the Hudson School in Long Beach, one stop on the NIEHS tour, estimated that the asthma rate there is nearly 25 percent. These young men play — and breathe deeply — just a few yards away from passing trucks. (Photo courtesy of John Schelp)



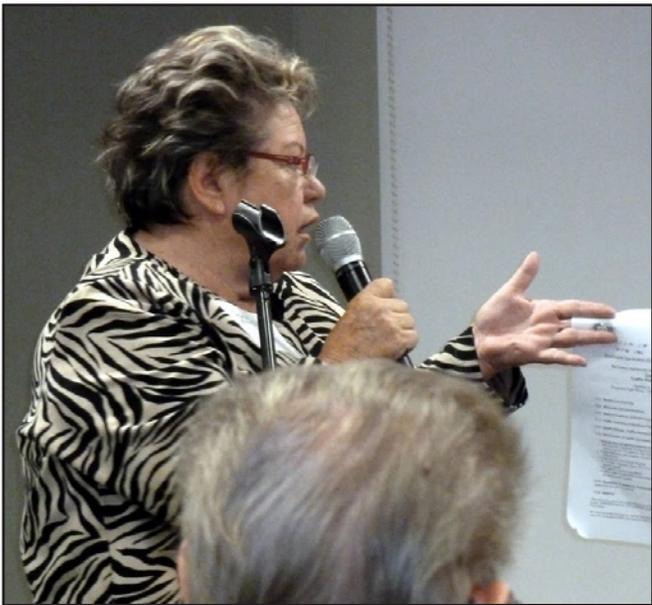
Birnbaum was looking for facts, and the vice president of the West Long Beach Association, left, was ready to oblige, by talking about truck traffic in his community. (Photo courtesy of John Schelp)



Birnbaum communicated NIEHS concern about the effects of poor air quality on health and the Institute's substantial financial commitment to helping find a solution. Seated to her right, facing the audience, are Hricko, right, and Gilliland, left. (Photo courtesy of John Schelp)



The audience was a tightly packed cross section of the population living along the LA-Long Beach corridor, but if any single group stood out it was the mothers. Many of them were vocal about fears for their children's health. (Photo courtesy of John Schelp)



According to the speaker from Boyle Heights, people in the community, where a number of major thoroughfares cross, often say, "All freeways lead to Boyle Heights." (Photo courtesy of John Schelp)



Attendees responded with a show of hands, when asked how many lived near the ports. (Photo courtesy of John Schelp)

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NIEHS aids the global fight against indoor air pollution

By Ian Thomas

In a new article in [Science](#), NIEHS Senior Advisor for Public Health, [John Balbus, M.D.](#), and three co-authors outlined the urgent need for government intervention in the fight against indoor air pollution (IAP). According to a report by the World Health Organization (WHO), IAP directly contributes to some 2 million fatalities each year, making it the leading cause of death worldwide, even greater than malaria.

 [Listen to an NIH radio interview with cookstove initiative leaders \(04:31\)](#)
 [Read Transcript](#)

“NIEHS is committed to understanding the major environmental causes of disease and disability around the world and IAP strikes at the heart of that commitment,” Balbus explained. “By funding research on the effects of household biomass burning and partnering with like-minded organizations, the Institute is helping to expand the knowledge base on this issue and improve the health of the world’s poorest populations.”

Why is IAP such a problem?

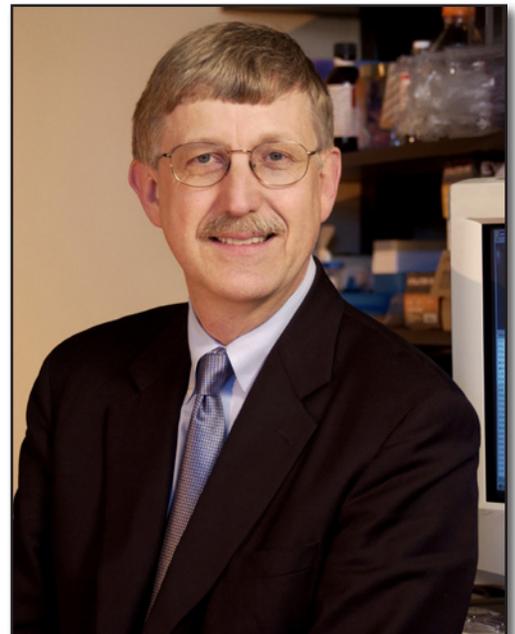
IAP is a form of air pollution that is caused by the burning of coal or biomass fuels, such as wood, crop residue, charcoal, or dung, in the millions of indoor fires and primitive stoves used by much of the poverty-stricken world. Utilized for both cooking and heating, these stoves produce thick clouds of black smoke that not only blacken walls and ceilings, but also lead to serious pulmonary, cardiovascular, and other health problems.

“Many people in developed countries don’t realize that smoke from indoor cooking fires is a terrible scourge upon the health of countless people,” said [Francis Collins, M.D., Ph.D.](#), director of the NIH and another author on the paper. “International efforts to combat this scourge are only now getting underway. Therefore, the NIH’s role is to support the research that will determine the most efficient, cost-effective means to do so while safeguarding human health.”

Collins and Balbus also point out that no one is more affected by this problem than women and children. Since many of their daily responsibilities require women to remain at home, they are at significantly increased risk for exposure, not to mention additional risk for gender-based violence when they do venture out in search of fuel to burn at home. Children under their care share those same exposures.



John Balbus (Photo courtesy of Steve McCaw)



Francis Collins (Photo courtesy of NIH)

“Tragically, many of them are children under the age of five who die of pneumonia induced by this very heavy exposure to the soot that builds up in those homes over time,” Collins noted. “Women are also particularly vulnerable because they spend so much time in the home, huddled over the fire, which places them at the same level of risk for cancer and chronic obstructive pulmonary disease as a long-term smoker.”

The road ahead

With awareness of IAP growing by the day, scientists note that the research base for this issue is far from complete. Moving forward, Balbus believes that the key to future IAP research will hinge on two key components — data collection and technology development.

“On the data front, we’ve got to focus on finding out more precisely what level of exposure reduction is necessary to reduce the risk of illnesses like pneumonia and COPD while also identifying the primary social and behavioral barriers to cookstove adoption in specific locations,” Balbus noted. “On the technology front, we need to develop monitoring equipment and biomarkers to chart both chronic exposure rates and their biological effects on inhabitants.”

A worthy cause

In the days ahead, finding solutions to this global problem promises to be a daunting task, particularly given the extreme state of poverty surrounding so many of the people who are affected by it. Still, the authors agree no cause is more just.

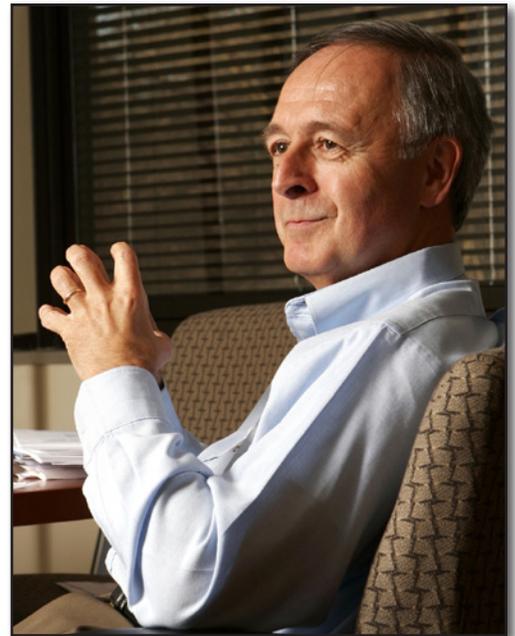
“They may be living in small huts or households that barely protect them from the elements and yet, like all of us, they must cook their food, heat their homes, and seek light when it is dark outside,” said William Martin, M.D., associate director for prevention research and health promotion at the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and the article’s lead author. “That’s why it’s the leading environmental cause of death in the world today.”

Fogarty International Center (FIC) Director Roger Glass, M.D., Ph.D., was also a co-author of the paper. FIC is dedicated to advancing the mission of the National Institutes of Health by supporting and facilitating global health research conducted by U.S. and international investigators.

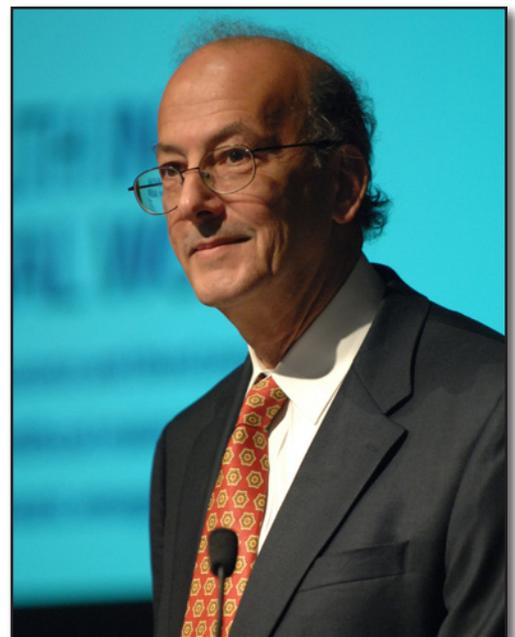
Citation: [Martin WJ 2nd](#), [Glass RI](#), [Balbus JM](#), [Collins FS](#). 2011. Public health. A major environmental cause of death. *Science* 334(6053):180-181.

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

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William Martin (Photo courtesy of Steve McCaw)



Roger Glass (Photo courtesy of the Fogarty International Center)

NIEHS trainees conquer dual-placement problem

By Erin D. Hopper

NIEHS trainees and husband-and-wife scientists Archana Dhasarathy, Ph.D., and Sergei Nechaev, Ph.D., recently secured tenure-track faculty positions together at the [University of North Dakota \(UND\) School of Medicine and Health Sciences](#), giving renewed hope to dual-scientist couples with academic aspirations. Dhasarathy and Nechaev have been working as postdoctoral scientists in the Laboratory of Molecular Carcinogenesis under the supervision of [Paul Wade, Ph.D.](#) and [Karen Adelman, Ph.D.](#), respectively.

The path to personal and professional success

Dhasarathy and Nechaev will forever treasure NIEHS as the place where they met, fell in love, and married. Both had aspirations to become lead researchers, but they also knew that achieving this goal without moving to separate locations would be a monumental challenge. When Dhasarathy was ready to start her job search, she immediately recognized that she would need the help of her professional network, so she started by notifying her contacts of her intentions.

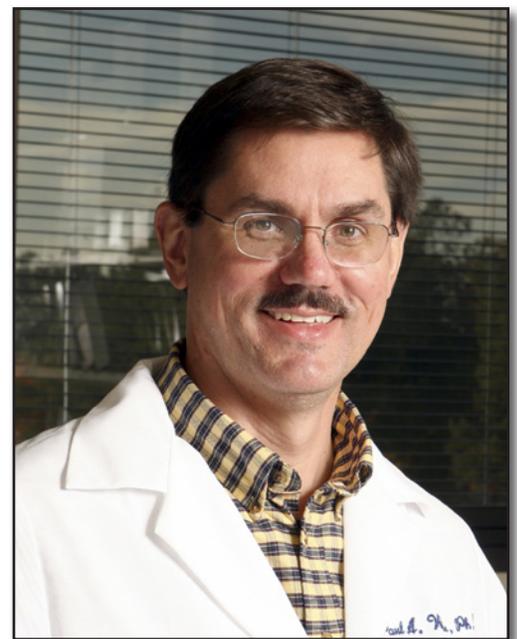
She learned about the opening at UND through her supervisor, Wade, who was very supportive of her academic job search. Wade asserts that Dhasarathy's deep love of science and leadership qualities will ensure her success in academia. "She really embodies persistence and stamina," he said. "She pursues her goals tirelessly, no matter what the obstacle."

Although the vacancy announcement had already expired, Dhasarathy contacted the department chair, who invited her to apply anyway. Two months later, her CV rose to the top of hundreds of applications, and she received an invitation for a telephone interview and then two onsite interviews. She found that practicing her seminar, among her colleagues, was particularly helpful in preparing for the onsite interview.

Throughout the interview process, Dhasarathy advocated for Nechaev, with the hope that he could find employment at UND, as well. She ultimately received an offer, but her excitement quickly diminished when she learned that the best they could do for Nechaev was a research associate position with the opportunity to apply for a faculty position in a year. After further negotiations, Nechaev received an invitation to interview and so impressed



Dhasarathy and Nechaev met and married while working as postdoctoral researchers at NIEHS. They are excited to begin a new phase of their careers as tenure-track faculty members at the UND School of Medicine and Health Sciences. (Photo courtesy of Steve McCaw)



Wade heads the Eukaryotic Transcriptional Regulation Group in the Laboratory of Molecular Carcinogenesis. He cites Dhasarathy's excitement and enthusiasm for science as keys to her success. (Photo courtesy of Steve McCaw)

the chair of the Department of Anatomy and Cell Biology that he received an offer shortly thereafter.

Adelman was not surprised at Nechaev's offer, describing him as an intellectual and creative driving force for her research program. "He was always eager to identify and tackle the biggest and most exciting questions in the field and, as a result, his work has made a tremendous impact and allowed him to establish himself as an independent scientist," she said.

Playing the job search lottery

Dhasarathy notes that her experience at NIEHS was critical to her success. She improved her writing skills by contributing to the Environmental Factor, and she gained valuable teaching experience in the NIH Summer Internship Program and at [North Carolina Central University](#). Nechaev also had several years of teaching experience at [Cold Spring Harbor Laboratory](#), and both scientists acknowledge that their teaching experience made them stronger candidates.

Dhasarathy and Nechaev were delighted to receive offers during their first round of applications. Dhasarathy attributed her success to both her current mentor and her graduate school mentor, Michael Kladde, Ph.D. "They were wonderfully supportive and behind me 100 percent throughout the application process. Their advice and experience helped me immensely, and I am eternally grateful," she said.

Although Dhasarathy and Nechaev laid the groundwork for academic positions through excellence in research, they credit some of their success to luck. Nechaev emphasized the importance of increasing an applicant's chances by applying to a large number of positions, likening the academic job search to playing a lottery as many times as possible. Dhasarathy agreed, chiming in, "The point is to play."

(Erin Hopper, Ph.D. is a postdoctoral fellow in the NIEHS Laboratory of Structural Biology Mass Spectrometry Group.)

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Adelman leads the Transcriptional Responses to the Environment Group in the Laboratory of Molecular Carcinogenesis. She attributes Nechaev's success to his technical brilliance and innovation. (Photo courtesy of Steve McCaw)

Tips for a Successful Academic Job Search

Nechaev and Dhasarathy experienced firsthand the challenges of academic job searches. Below is a run-down of their keys to success.

- Cast a wide net
- Be flexible regarding location
- Apply to a large number of positions
- Be persistent
- Remain open-minded and flexible regarding departments and position descriptions
- For couples: anchor yourself with one offer and use it to draw another
- Build a strong network and use it to identify openings, strengthen your application, and learn more about the universities to which you are applying
- Even if a posting has closed, contact the department chair and apply anyway
- Practice your seminar in front of a group of experienced scientists
- Talk to your colleagues, both past and present — they will be able to offer invaluable advice

NIH launches research program to explore health effects from climate change

By Ed Kang

A new research program, funded by the NIH, will explore the role that a changing climate has on human health. Led by NIEHS, the program will research the risk factors that make people more vulnerable to heat exposure; changing weather patterns; changes in environmental exposures, such as air pollution and toxic chemicals; and the negative effects of climate change adaptation and mitigation efforts.

In addition to better understanding the direct and indirect human health risks in the United States and globally, one of the program's goals is to determine which populations will be more susceptible and vulnerable to diseases exacerbated by climate change. Children, pregnant women, the elderly, people from low socioeconomic backgrounds, and those living in urban or coastal areas and storm centers may be at elevated risk. This program will also help to develop data, methods, and models to support health impact predictions.

"Governments and policy makers need to know what the health effects from climate change are and who is most at risk," said John Balbus, M.D., NIEHS senior advisor for public health and lead for NIEHS' efforts on climate change. "The research from this program will help guide public health interventions, to ultimately prevent harm to the most vulnerable people."

Result of earlier NIH initiatives

The funding program is an outgrowth of two previous efforts led by NIH. A December 2009 workshop, sponsored by a trans-NIH working group, brought leaders in the field together to begin identifying priorities for NIH climate change research. NIH then led the ad hoc Interagency Working Group on Climate Change and Health in developing an outline of research needs, which are described in a report available at http://www.niehs.nih.gov/health/assets/docs_a_e/climatereport2010.pdf.

Caroline Dilworth, Ph.D., health scientist administrator in the NIEHS Division of Extramural Research and Training, oversees the grants and anticipates funding additional projects in this important portfolio. "This research will clarify how changes in climate and our environment affect not just heat stress, but also common diseases, such as asthma, cardiovascular disease, and stroke," she said.

In addition to NIEHS, support for the research projects also comes from the National Institute on Aging (NIA) and the Fogarty International Center (FIC).



Dilworth will oversee research activities funded by NIEHS as part of the new program. (Photo courtesy of Steve McCaw)



Based in Bethesda, Md., Balbus is the NIEHS liaison to NIH Institutes and Centers and other federal agencies in several areas of public health. (Photo courtesy of Steve McCaw)

For additional information on these and future projects, visit the NIEHS Human Health Impacts of Climate Change Web page at <http://www.niehs.nih.gov/research/supported/programs/climate/index.cfm>.

(Ed Kang is a public affairs specialist in the Office of Communications and Public Liaison and a regular contributor to the Environmental Factor.)



The 2010 NIEHS-led working group report, “A Human Health Perspective on Climate Change,” provided a starting point for coordination of federal research to better understand climate’s impact on human health. The recommendations of the working group included research to identify the most vulnerable populations and what efforts will be most beneficial

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New directions in climate change research

- **Ralph Delfino, M.D., Ph.D.**, University of California, Irvine — Funded by NIEHS to identify populations of children with asthma most vulnerable to air pollutants that are expected to increase with climate change.
- **Julia Gohlke, Ph.D.**, University of Alabama at Birmingham — Funded by NIEHS to determine whether significant differences in vulnerability to heat-related health impacts exist between urban and rural communities.
- **Karen Levy, Ph.D.**, Emory University — Funded by FIC to examine the impact of current and projected climate variables on the incidence of gastrointestinal disease in Ecuador, for use as a model system to help determine the importance of social factors and infrastructure availability in preventing gastrointestinal disease globally.
- **Jonathan Patz, M.D.**, University of Wisconsin–Madison — Funded by NIEHS to develop models that factor in climate, air quality, power plant emissions, and health models, to determine which populations will be most exposed to air pollution-related health risks.
- **Roger Peng, Ph.D.**, Johns Hopkins University — Funded by NIEHS to quantify the effects of biological, environmental, and socioeconomic factors that make people more vulnerable to extreme heat.
- **Joel Schwartz, Ph.D.**, Harvard University — Funded by NIA to examine the impact of changing weather patterns, such as temperature, humidity, and barometric pressure, on the elderly, as observed through changes in blood pressure, inflammation, lung function, and related health outcomes. Funded by NIEHS to identify medical and other individual characteristics that put people at increased risk of dying due to weather, and determine air pollution impacts that contribute to those risks.
- **Antonella Zanobetti, Ph.D.**, Harvard University — Funded by NIEHS to define and forecast high risk days, given pollution and climatic conditions, to help determine how reduction in pollution or improvement in climatic conditions could improve cardiovascular and cerebrovascular health.
- **Ying Zhou, Sc.D.**, Emory University — Funded by NIEHS to develop models to identify vulnerable geographical locations with increased health impacts due to heat waves and air pollution exposures.

New website brings environmental health to kids and classrooms

On Oct. 3, NIEHS launched a complete redesign of its extremely popular [Kids' Web pages](#). The new site features modern design, colorful graphics, and musical elements. More importantly, it ties in relevancy to environmental health sciences by introducing children to concepts, simple experiments, quizzes, and other fun and educational activities. For teachers, the site features lesson plans and classroom activities that help bring environmental health concepts into the classroom.

“Our Kids web site is extremely popular and gets more than 14 million visits each year,” said Christine Flowers, NIEHS communications director. “It’s become a place where children and adults first learn about the NIEHS and how the environment influences everyone’s health.” That tie-in between the entertainment aspects and the informational components was a key driver for the site’s redesign.

Achieving a contemporary look and feel was another important goal for the project. After more than 15 years, the former site’s design was ready for a refresh. “The new look has a fresh new face that younger children and their parents and teachers will really enjoy,” said Ed Kang, public affairs specialist in the Office of Communications and Public Liaison (OCPL) who was the project manager for the design overhaul.

Kang was quick to recognize the input of many NIEHS staff who took part in the process. “Our employees have been generous with their time, and their feedback and input has been invaluable to the project,” he said. In addition to participating in focus groups and providing design input, employees even offered up their children as usability testers. “Having kids, and even a few of their teachers, give us feedback, made for a quality product we can be confident people of all ages will continue to use,” said Kang.

Now that a new design is complete, the next phase will add new content, photos, and videos to ensure there is ongoing relevancy to current health topics. Future content will also be focused on a broader age range of children to encompass students in grades 6 –12.

“There are about 1,000 pages to enjoy now, and we want to add even more,” said Kang. “As an Institute, we should strive to offer quality science content that is attractive to children.”



In addition to his special projects, such as the Kids' Page redesign, Kang is also the NIEHS lead in social media communications as the OCPL lead in communications for the Division of Extramural Research and Training grant portfolio. (Photo courtesy of Steve McCaw)



Home



Discover & Explore



What's that Word?



Scientific Kids



Fun & Games



Parents & Teachers



Oil Spills

No one really knows how oil and clean-up chemicals can affect people's health. That's why NIEHS is conducting a health study in the Gulf region.

More



You & Your Genes 

Environment & Your Health

Reduce, Reuse, Recycle

Natural World

Healthy Living

Pollution

Science—How It Works



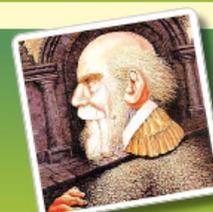
Hey You!

Which do you like?

- Being outdoors
- Doing experiments
- Helping people

Would you like to be an environmental scientist?

Find Out!



Illusions!

Can you believe your eyes?



The new NIEHS Kids' Pages can be found at <http://kids.niehs.nih.gov>.

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Breast cancer panel moving forward, eyeing completion

By Ernie Hood

When the 19-voting-member Interagency Breast Cancer and Environmental Research Coordinating Committee (IBCERCC) meets in person, as it did for the third time Sept. 26-27 at NIEHS in Research Triangle Park, N.C., it focuses squarely on its congressionally mandated task—to prepare a comprehensive report on federal research in breast cancer and the environment for the Secretary of the U.S. Department of Health and Human Services (HHS).

The committee has been empanelled since 2010 and is led by NIEHS in collaboration with the National Cancer Institute (NCI). Its three subcommittees, each charged with a section of the planned report, have met frequently by teleconference in recent months and brought chapter drafts to the meeting for comparison and review by the entire panel.

Identifying gaps in the research

Gwen Collman, Ph.D., director of the NIEHS Division of Extramural Research and Training and co-executive secretary of the IBCERCC, said it was a very productive meeting. “Everybody came prepared to do a lot of work,” she observed. “They had done quite a bit of preparation in their teleconferences to bring their ideas and documents to the meeting, and I think the time was spent very wisely going through all of the recommendations and ideas that the subcommittees had, critiquing each other, and looking for gaps and feedback.”

Now the members of the three subcommittees — state-of-the-science; research process; and research translation, dissemination, and policy implications — will fill those gaps and incorporate that feedback, to bring their individual chapters to completion.

Orchestrating a summary of group findings

As part of the process of synthesizing the various elements emerging from the subcommittees’ drafts, the full committee also worked to identify the



The 19-member IBCERCC panel is nearing completion of its report for the Secretary of HHS. (Photo courtesy of Arnold Greenwell)



NIEHS/NTP Director Linda Birnbaum, Ph.D., left, took advantage of the morning break to catch up with Forman. Forman chairs both the IBCERCC and its state-of-the-science subcommittee. (Photo courtesy of Arnold Greenwell)



Lively discussions were frequent and all voices were heard as the group reached consensus on several issues. Dale Sandler, Ph.D. from NIEHS, right, responds to a comment by Christine Ambrosone, Ph.D., from the Roswell Park Cancer Institute. (Photo courtesy of Arnold Greenwell)

common threads and themes that will allow the report to speak in a single, unified voice to the many audiences it will reach beyond the Secretary's desk. An important step toward that goal was to begin to coalesce the report's recommendations into a cogent executive summary designed for maximum exposure and effect.

"We're hoping that the long-term impact is significant in filling the gaps in knowledge of the role of the environment in breast cancer, and also in setting a platform for more collaboration across federal agencies in not only the conduct and funding of the research, but also in the strategy for prevention policy," said committee chair Michele Forman, Ph.D., a professor of epidemiology from the University of Texas M.D. Anderson Cancer Center.

Keeping different audiences in mind

Collman agreed that the committee had done some excellent work on the nuts and bolts of the report. "I think the biggest accomplishments were to have the committee members be thoughtful about what they wanted the report to look and feel like, to really talk about what kinds of things would go in the executive summary, and the idea that the report itself has many, many audiences and should be disseminated to many people," she said.

The committee also set a timeline for completion and submission of the report. At this point, the plan is to send the completed report to the Secretary by the end of March 2012. As work on the executive summary and the individual chapters, along with extensive appendices, continues, committee members will also review a consensus study on breast cancer and the environment research currently being prepared by an Institute of Medicine (IOM) committee. The IOM report, which the committee anticipates will be complementary to its own, is expected to be released in December.

In late January 2012, the IBCERCC will gather in full committee mode once again at NIEHS.

(Ernie Hood is a contract writer for the NIEHS Office of Communications and Public Liaison.)

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Kenneth Portier, Ph.D., represents the American Cancer Society on the IBCERCC. (Photo courtesy of Arnold Greenwell)



Breast Cancer Options President Beverley Canin, center left, and Ysabel Duron, center right, are clearly focused on the presenter. Duron, the director and founder of Latinas Contra Cancer, an advocacy group based in San Jose, Calif., is the newest member of the IBCERCC. (Photo courtesy of Arnold Greenwell)



Collman, center, urged committee members to be mindful of the interests of different stakeholders in the report's outcome. (Photo courtesy of Arnold Greenwell)

Training program celebrates 15-year investment in environmental justice

By Ian Thomas

The NIEHS Worker Education and Training Program (WETP), led by Industrial Hygienist Sharon Beard, in conjunction with the Environmental Justice Committee and the American Public Health Association, held a nationwide webinar Oct. 13 to recognize the latest achievements of the Minority Worker Training Program (MWTP). As a collection of government-funded training programs, MWTP oversees projects designed to educate, train, and open career opportunities for socially disadvantaged individuals in the fields of environmental construction and hazardous waste remediation.

The webinar, titled “Environmental Justice and Hazardous Waste Worker Training Programs: 15 Years of Investment in Environmental Justice,” featured guest speakers from across the MWTP landscape, including federal employees tasked with program governance, as well as private sector and nonprofit personnel responsible for the on the ground training and evaluation.



Beard is shown talking environmental justice with attendee Alexander Prentzas of OAI, Inc., at an earlier WETP workshop. She moderated a plenary session on “Environmental Justice and Good/Green Jobs for All.” (Photo courtesy of Steve McCaw)

Addressing health and safety needs of low-income workers

“Many of the people we work with have an increased risk of injuries, illness, and mortality, because they often work in the dirtiest of jobs,” said Beard, a longtime member of WETP. “Because of their low-income status, they oftentimes lack the kind of formal training necessary to be able to perform those jobs safely and in some cases, they even lack the proper safety and protective gear.”

Since 1996, the MWTP has trained nearly 5,500 employees, 67 percent of whom went on to full-time employment in their respective areas.

Tim Fields, the senior vice president of MDB, Inc.’s environmental justice practice and the webinar’s second speaker said, “These programs provide low-income residents with the knowledge and training they need to not only gain employment, but also begin addressing the environmental concerns in their own communities.”

Looking ahead, environmental justice specialists agree that, while much good has come from programs under the MWTP banner, there is still much to be done. With 20 nonprofit organizations and more than 100 universities, labor-safety programs, and institutions already on board, WETP continues to expand and create job opportunities for minorities in the environmental cleanup field.

“This year, our grantees were offered a combined 281 courses worth of training,” Beard explained. “That comes out to roughly 156,000 contact hours with students, and there is still more to do. In the fight against social and health disparities, helping to create more opportunities for low-income and disadvantaged individuals is the key to changing people’s lives for the better.”

Also speaking at the webinar were Donald Killinger of The New York City District Council of Carpenters and Kizetta Vaughn of The Center for Construction Research and Training.

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

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NIEHS grantees collaborate with NTP, FDA on BPA studies

By Robin Mackar

Twelve researchers received NIEHS funding this fall to work in collaboration with NTP and the U.S. Food and Drug Administration (FDA) to help develop state-of-the-art rodent studies on the chemical bisphenol A (BPA). The information generated from these studies is expected to help regulatory agencies faced with the responsibility of determining the safety of products being used by consumers.

The selected grantees ([see text box](#)), known for their expertise in conducting research on the health effects of BPA, will have an opportunity to work with a multidisciplinary team of scientists from the NTP and FDA to suggest disease endpoints to be looked at, and also provide input on the overall design of the BPA studies.

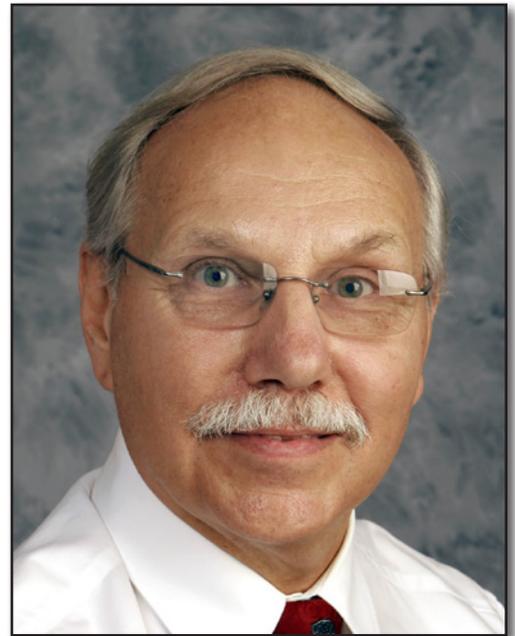
The long-term BPA rodent studies will be conducted at the National Center for Toxicological Research (NCTR), in Arkansas, FDA's internationally recognized research center that has worked with NIEHS for over 30 years in carrying out studies in support of the NTP mission. These BPA studies are being designed in accordance with established good laboratory practices (GLP).

“Having our grantees involved in this seminal experiment, that integrates a GLP-compliant study with additional disease endpoints, will provide the data needed to build consensus on the health effects of BPA,” said Jerrold Heindel, Ph.D., program administrator in the NIEHS Division of Extramural Research and Training (DERT). The 12 grantees were selected from an NIEHS [funding announcement](#) made last year. DERT will invest approximately \$2 million per year over the next four years for these efforts, according to Heindel. NTP is investing about \$3 million per year through an interagency agreement with NCTR.

The studies at NCTR are expected to start before the end of the year. Currently, the researchers are working on establishing the dose levels for the multigenerational studies.

In addition to looking at traditional toxicological endpoints, such as cancer, the grantees are working with NTP to look at disease or dysfunction endpoints not typically measured in GLP guideline studies.

“We're hopeful that this unprecedented integrated research project, that we're about to embark upon, will reduce some of the uncertainties and research gaps in the BPA arena, and provide us with better information on this chemical,” said John Bucher, Ph.D., associate director of NTP and director of the NIEHS Division of the National Toxicology Program.



Heindel leads a comprehensive and integrated BPA research initiative. (Photo courtesy of Steve McCaw)

The program provides an opportunity to leverage resources and ideas between NIEHS-funded researchers studying BPA, the NTP, and the FDA. The backbone of the new studies is that they will follow good laboratory practices, which will add utility to regulatory agencies.

“This collaborative research effort exemplifies how different parts of the federal government and academia are working together to address a public health problem,” said Linda Birnbaum, Ph.D., NIEHS/NTP director.

(Robin Mackar is the news director in the NIEHS Office of Communications and Public Liaison and a regular contributor to the Environmental Factor.)

Recipients of the NIEHS funding and their research areas

- Nira Ben-Jonathan, Ph.D., University of Cincinnati — Metabolism and heart disease
- Kim Boekelheide, M.D., Ph.D., Brown University — Male reproduction
- Jodi Flaws, Ph.D., University of Illinois at Urbana-Champaign — Female reproduction and fertility
- Nestor Gonzalez-Cadavid, Ph.D., Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center — Male reproduction
- Andrew Greenberg, Ph.D., Tufts University — Metabolic disease and diabetes
- Shuk-Mei Ho, Ph.D., University of Cincinnati — Cancer
- Norbert Kaminski, Ph.D., Michigan State University — Immunity
- Heater Patisaul, Ph.D., North Carolina State University — Neurobehavior
- Gail Prins, Ph.D., University of Illinois at Chicago — Prostate cancer
- Ana Soto, M.D., Tufts University — Mammary cancer
- Frederick vom Saal, Ph.D., University of Missouri — Reproductive development
- Robert Zoeller, Ph.D., University of Massachusetts, Amherst — Brain and thyroid function

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Environmental toxicologist David Eaton elected to Institute of Medicine

By Elizabeth Sharpe

The Institute of Medicine (IOM) announced Oct. 17 that University of Washington (UW) faculty member [David Eaton, Ph.D.](#), has been elected a member of the IOM.

Eaton is professor of environmental and occupational health sciences in the UW School of Public Health and associate vice provost for research-external relations in the UW Office of Research.

At the UW, Eaton directs the [Center for Ecogenetics and Environmental Health](#), funded by NIEHS. Eaton founded the Center in 1995. He also holds adjunct faculty appointments in public health genetics and medicinal chemistry.

He is among 65 Americans and five foreign associates newly elected to the IOM. Election to the IOM is considered one of the highest honors in the fields of health and medicine. Membership recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. Eaton brings to 53 the number of UW faculty members who have been elected to the IOM.

“It is with great pleasure that we welcome these distinguished and accomplished individuals to the Institute of Medicine,” said IOM President Harvey V. Fineberg, M.D., Ph.D. “Each of them stands out as a professional whose research, knowledge, and skills have significantly advanced health and medicine, and their achievements are an inspiration. The Institute of Medicine is greatly enriched by the addition of our newly elected colleagues.”

Eaton is highly regarded for his work on toxins in the environment. Nationally, he is past president of the Society of Toxicology and treasurer of the American Board of Toxicology. His active roles on boards and commissions studying environmental health include serving on the National Academy of Sciences/National Resource Council Board on Environmental Studies and Toxicology.

He has chaired or served on numerous other National Academy of Sciences committees dealing with controversies in toxicology, such as safe levels of arsenic in drinking water, evaluation of the U.S. Environmental Protection Agency’s risk assessment on dioxins in the environment, and a review of the federal strategy to address environmental health and safety issues related to nanomaterials.

New members to the IOM are elected by active members through a highly selective process that recognizes individuals who have made major contributions to the advancement of the medical sciences, health care, and public health. “I am deeply honored by this recognition from my peers,” said Eaton. “To share in this distinction with faculty from the UW who have been elected in past years is the greatest honor I could ever hope to achieve. I’m humbled to be included in this distinguished group.

The IOM is unusual in its structure as both an honorific membership organization and an advisory organization. It was established in 1970 as the health branch of the National Academy of Sciences, and is a national resource for independent, scientifically informed analysis and recommendations on health issues. Its members commit to serve voluntarily on the institute’s committees, boards, and other activities. Eaton received his Ph.D. in pharmacology in 1978 from the University of Kansas Medical Center, where he also completed a postdoctoral fellowship in toxicology. In 1979, he moved to Seattle to join the UW faculty. Eaton is an elected fellow of the American Association for the Advancement of Science and the Academy of Toxicological Sciences. He has published more than 150 scientific articles and book chapters on toxicology and risk assessment.

(Elizabeth Sharpe is communication director in the Department of Environmental and Occupational Health Sciences at the University of Washington School of Public Health. Her story first appeared Oct. 17 as a [press release](#) in UW Today.)

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Eaton will join the distinguished group of scientist who have served on IOM, among them NIEHS/NTP Director Linda Birnbaum, Ph.D. (see story) who was elected in 2010. (Photo courtesy of the University of Washington)

NIH issues LAB Challenge for K-12

By Ashley Godfrey

As the [Environmental Health Perspectives \(EHP\) Education and Outreach Program](#) manager, Banalata (Bono) Sen, Ph.D., is one of 12 NIH committee members issuing a groundbreaking, nationwide science education challenge. The [NIH Lessons About Bioscience \(LAB\) Challenge](#) is asking everyone for help in bringing hands-on science into K-12 classrooms through online submissions of innovative classroom-ready experiments by its Dec. 1 deadline.



Linked video:
Watch NIH LAB Challenge recruitment video (01:56)
(Launches in new window)

Download Media Player:  Flash [↗](#)



Sen, a former postdoc at the EPA, joined the EHP staff in 2009. Her office also sponsors the EHP Teacher Professional Development Workshop, which is offered every summer here at the NIEHS (see story). This workshop continues to receive very positive reviews from both the teachers who come to learn, as well as the trainees who help develop the environmentally themed, hands-on lesson plans for the teachers. (Photo courtesy of Steve McCaw)

Introducing kids to the joys of science

Sen is a member of the Science Education Resource Group (SERG), a committee composed of members representing all the NIH institutes and centers, which is issuing this exciting science education challenge. The goal of this challenge is to get students excited about science, by providing teachers with a convenient collection of engaging, inexpensive, and hands-on fun experiments that can be conducted in any classroom.

The committee is specifically looking for experiments that:

- Are geared toward grades K-12
- Use safe, easily available, inexpensive materials
- Take 90 minutes (or less) of class time
- Have a clear learning objective (a statement that describes the knowledge or skills that a student should be able to obtain following the science experimental procedure)
- Are related to the NIH mission of health and life sciences

The idea for the challenge came from a conversation between NIH Director Francis S. Collins, M.D., Ph.D., and U.S. Secretary of Education Arne Duncan. During National Lab Day last year, Collins taught a hands-on experiment to a group of high school students, using strawberries to extract DNA, and was impressed with how engaged the students were.



In the video made by NIH to help promote the challenge, science rapper Zach Charlop-Powers demonstrates how much fun extracting DNA from strawberries can be. This simple, hands-on experiment is exactly what the NIH LAB Challenge is eager to bring to K-12 classrooms everywhere. (Image courtesy of NIH)

He described the activity in a meeting with Duncan, who responded by asking whether Collins could come up with 99 more hands-on experiments for students in kindergarten through high school. SERG picked up the idea and began working to fill the void.

Creating a 24/7 archive for teachers and parents everywhere

SERG plans on recruiting both teachers and scientists to help pick the top entries out of all of the submissions it receives. “We hope to be able to actually try out all of the experiments ourselves to see how well they work,” Sen said. The committee is especially excited about seeing what new and imaginative submissions will come in, since the challenge is open to experiments on any health and life science topic.

All of the winning experiments chosen by the committee will be compiled as part of the NIH collection of the best experimental procedures. This collection will be available worldwide for free in print, online, and on mobile devices from the [NIH Office of Science Education](#). Participants whose submissions are picked to be part of the final collection will be recognized by publication of their names and organizations along with their experiments, and they will receive an official winner’s badge they can proudly display on social media sites and websites.

“We would love to see submissions from the NIEHS covering any topic related to environmental health,” stated Carla L. Easter, Ph.D., science education specialist at the [National Human Genome Research Institute](#) and lead of the LAB Challenge.

Bringing environmental health news to the public

As a member of the National Science Teachers Association, Sen has access to a large listserv of teachers. During the planning phase of the LAB Challenge she took advantage of her network of educators

NIEHS and EHP science education and outreach efforts

Increased awareness of the importance of science education and outreach is being felt throughout the entire Institute. Along with Sen, Ericka Reid, Ph.D., education outreach specialist in the [NIEHS Office of Science Education](#), has been instrumental in connecting NIEHS trainees with many exciting science education and outreach opportunities. Planning is currently underway by a group of NIEHS postdocs to develop an environmentally themed curriculum to be taught in the spring to middle school students enrolled in the [Citizen Schools](#) after school program at Lowe’s Grove Middle School in Durham, N.C.

“The Citizen Schools program will give us [postdoc fellows] the opportunity to create and teach a ten-week curriculum focused on human health and the environment,” explained Nisha Cavanaugh Ph.D., who is leading the group of postdocs involved. “At the same time, we can get middle school students from low-income communities excited about math and science, and encourage them to consider pursuing biomedical careers.”

Workshops and presentations sponsored by the EHP Education and Outreach Program include:

- North American Association for Environmental Education, Oct 12 –15, 2011, Raleigh, NC — EHP presentations on “Environmental Health Education Resources and Programs for Students and Educators”; “Climate Change Matters: A Human Health Perspective”; and “Teaching Climate Change: Evaluation of Two Non-traditional Programs,” a joint presentation with the U.S. Environmental Protection Agency (EPA)
- National Science Teachers Association National Conference, March 29-April 1 2012, in Indianapolis — National Oceanic and Atmospheric Administration/U.S. Forest Service/NIEHS Symposium: Climate Change Here and Now: Communicating and Teaching About Climate Change
- EPA-NIEHS “High School Student Workshop on Climate Change,” summer 2012, at the EPA in Research Triangle Park, N.C.
- EHP Teacher Professional Development Workshop, summer 2012, NIEHS

to help review the submission application and make sure the result will be easily adapted for use by any teacher in any type of classroom. As manager of the EHP Education and Outreach Program, one of Sen's many goals is to bring environmental health information to the public as part of the total NIEHS outreach effort ([see text box](#)).

Environmental health is not usually a part of classroom curriculum, so what Sen has done with her program is to take EHP content and create new grade-appropriate lesson plans. "What we are trying to do is connect the students with real-world examples, so they can learn about the connection between their health and their environment," explained Sen.

(Ashley Godfrey, Ph.D., is a postdoctoral fellow in the Molecular and Genetic Epidemiology Group in the NIEHS Laboratory of Molecular Carcinogenesis.)

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Birnbaum addresses GSK women scientists

By Eddy Ball

NIEHS/NTP Director Linda Birnbaum, Ph.D., took her message of work/life balance to the GlaxoSmithKline (GSK) Women in Science Annual Meeting Oct. 3 in Research Triangle Park (RTP), N.C. In her keynote talk before the group, Birnbaum reassured her audience that "You *Can* Have It All."

Each year, the North Carolina GlaxoSmithKline Foundation hosts two annual events for Women in Science — an annual meeting in October and a conference in the spring – inviting scholars, mentors, faculty representatives and staff for a day of networking, learning, and sharing the wonders of science and the wisdom of women.

As she began her talk, Birnbaum thanked the GSK Women in Science for their efforts in providing scholarships and mentoring for female undergraduate students. The foundation has established more than \$1.7 million in endowed scholarships at 29 colleges and universities across North Carolina, funded through its [Women in Science Scholars Program](#).

Reflecting on a life fully lived

In the first part of her talk, Birnbaum told the audience of women gathered at the Sheraton Imperial Hotel and Conference Center in RTP, "Having it all is a very individual thing. For me, it's fulfilling my love of science, keeping involved with the community, and of course my family." The inspirations for every aspect of her life, she added, are fun and passion — in science; in her role as daughter, mother, grandmother, and spouse; and in her commitment to religious and social community.

With a picture of herself as teenager Linda Silber, the girl scientist featured in the Dec. 8, 1961 issue of Life magazine, on the screen behind her, Birnbaum acknowledged her good fortune. "Great parents supported my interests, great teachers made it OK to be a girl and like science, great mentors gave me opportunities for growth."



"Development is a sensitive time for exposure for any number of reasons, including rapid growth, an increased metabolic rate, active cell differentiation, a developing (programmable) immune system, poor liver metabolism, and an immature blood/brain barrier," Birnbaum said of the developmental theory of disease. (Photo courtesy of Steve McCaw)

Photos of her and her family served as a backdrop, as Birnbaum traced her career through its early years at NIEHS, her 19 years at the U.S. Environmental Protection Agency, some of her many honors for her work in toxicology and public health, and her selection in December 2008 to head NIEHS, overseeing more than 1,400 federal and contract employees, as well as a budget of \$800 million in 2011.

Today's passion — a conceptual shift in environmental health sciences

The core of Birnbaum's talk focused on what having it all as a scientist means to her in today's world and her passion for promoting environmental public health.

She reviewed the new disease paradigm based on the concept of the developmental origin of disease through epigenetic modification of gene expression, triggered by environmental exposures during windows of susceptibility. According to recent research, environmental exposures during times when the human body is especially sensitive to their effects, such as fetal development, childhood, and adolescence, may set the stage for disease onset in later life.



The photo of young scientist Linda Birnbaum, née Silber, ran in Life magazine the year before Rachel Carson published her historic critique of chemical pesticides.

Birnbaum spoke proudly of the Institute's leadership in a broad range of new and renewed areas of interest, from endocrine disruption research and breast cancer research to work on the front lines as part of the GuLF STUDY (Gulf Long-term Follow-up Study) and other public health efforts in the aftermath of the Deepwater Horizon disaster. As she does in all her talks before such groups, Birnbaum, the first toxicologist to head NIEHS, recounted the achievements of the National Toxicology Program and its paradigm-shifting predictive toxicology initiative, known as Tox21.

As Birnbaum reached the conclusion of her talk, she told her audience, "We've really come a long way, women and research. It's been thrilling to be a part of it all." Her talk ended where environmental health science and much of young Linda Silber's own passion for it really began. Birnbaum offered a tribute to another passionate woman — author and environmentalist Rachel Carson, whose dire prediction of a "Silent Spring" in 1962 may well turn out to be one reason it hasn't come true.

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NIH looks toward new opportunities for underrepresented minorities

By Eddy Ball

NIH observed Hispanic Heritage Month Oct. 5, as it celebrated accomplishments of the Hispanic community and predicted advances to come for underrepresented minorities.

The choice of the speaker at the event in Bethesda, Md., biochemist [Ernest Márquez, Ph.D.](#), a retired NIH health scientist administrator and current president of the [Society for Advancement of Chicanos and Native Americans in Science \(SACNAS\)](#), showcased a high-profile Hispanic scientist, while also marking the recent establishment of a SACNAS chapter at NIH.

Along with a number of Hispanic scientists at NIH and a delegation of students from nearby Wheaton High School in Silver Spring, Md., also on hand for the celebration was NIH Hispanic Employment Program Manager Gerard Roman, who is based at NIEHS and serves as liaison at the Institute for services provided by the NIH Office of Equal Opportunity and Diversity Management.

The NIH commitment to diversity and the challenges it faces

Preliminary speakers at the event included [NIH Deputy Director Lawrence Tabak, D.D.S., Ph.D.](#); Michael Sesma, Ph.D., a program official at the National Institute of Mental Health (NIMH); and Arlyn Garcia-Perez, Ph.D., assistant director of the NIH Office of Intramural Research. Tabak hailed the founding of the new SACNAS chapter as a fruitful partnership between NIH and the group that promises to help NIH boost outreach and recruitment to a very important and growing population.

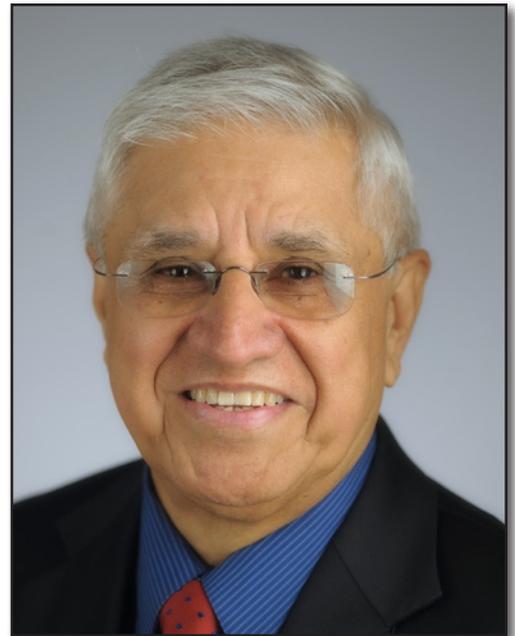
Sesma, who introduced Márquez, his longtime friend and former colleague at NIMH, shared with the audience what he called his elevator story. In 1995, he and a small group of Hispanic scientists found themselves in the same elevator on the way to a meeting, and he said he recalled thinking, “If something happens on this elevator, a lot of the Hispanics at NIH will be gone.”

At the time, Hispanics represented about 2.5 percent of employees at NIH, about the same percentage as in 2011. For Sesma, despite advances toward the goal of diversity, that sobering statistic underscores how much work still lies ahead to realize a truly representative workforce.

Prospects for moving forward as partners

Márquez touched on both faces of the Hispanic experience at NIH — the leadership’s genuine commitment to improving opportunities for under-represented minorities (URM) and the reality of how much change is needed to achieve parity for URM scientists. His talk on the topic, “SACNAS: Enhancing STEM [science, technology, engineering, and mathematics] Education in the United States,” outlined the ways he feels the NIH-SACNAS partnership can help NIH attract URM scientists and other professionals.

“The way to strengthen our country is through science, technology, engineering, and math,” Márquez began. In the course of addressing what he called the national imperative to build a strong domestic STEM workforce, broaden participation in our nation’s science, and become more globally competitive, he emphasized, “We need to be as diverse as we can.”



Even though its 2011 meeting Oct. 27-30 is expected to attract 3,500 attendees and more than 300 exhibiting institutions, Márquez was quick to remind the audience, “SACNAS is much more than a conference.” He pointed to its Leadership Institute, 65 chapters, regional meetings, extensive archive of publications, and revamped website, as well as emerging social media initiatives. (Photo courtesy of Ernest Márquez)



Tabak assured the audience, “We [at NIH] take very seriously the challenge of reaching out to Hispanics and other diverse groups.” (Photo courtesy of NIH)

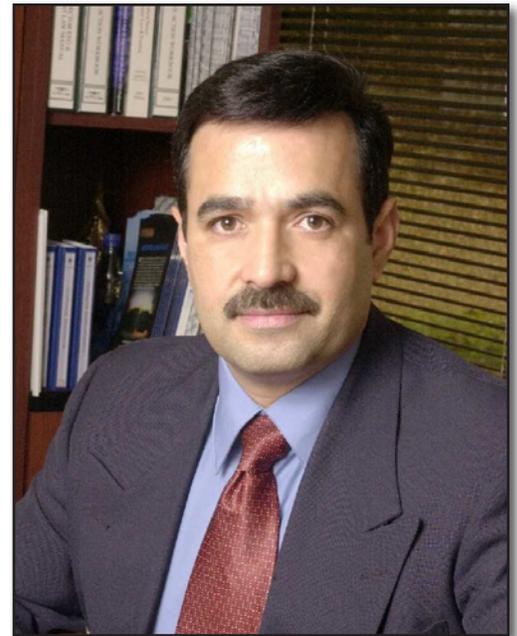
Diversity brings different perspectives and approaches for solving complex human problems and expanding the talent pool to enhance innovation and improve the nation’s global economic leadership, Márquez continued, and can also help NIH more effectively address the persistent problem of health disparities.

An uphill effort

Comparing the percentage of URM people in the population, 28.5 percent, to their presence in the science and engineering workforce, 9.1 percent with doctorates, Márquez observed, “This suggests that the proportion of URM would need to triple to match their share of the overall U.S. population. That is a huge challenge ... and it’s not all going to happen at SACNAS.”

Still, the award-winning SACNAS brings some important strengths to its partnership with NIH, Márquez said — a diverse blend of science, culture, and community, as well as a strong focus on mentoring and high-quality, multi-disciplinary science. SACNAS is an excellent venue for NIH recruitment of URM employees, he explained. It also has a commitment to community-based participatory research and outreach capabilities that could help raise awareness of scientific opportunities for young minorities and boost much-needed URM community involvement in clinical trials.

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Roman said he was encouraged by the newly established SACNAS chapter at NIH and anticipates the partnership will also help NIEHS improve its representation of Hispanics and other URM populations. He noted that NIEHS Education Outreach Specialist Ericka Reid, Ph.D., planned to represent the Institute at the SACNAS meeting. (Photo courtesy of Steve McCaw)

Hispanic health leader speaks at NIEHS

By Melissa Kerr

NIEHS observed Hispanic Heritage Month Oct. 12 with a seminar by Jane Delgado, Ph.D., president and chief executive officer of the [National Alliance for Hispanic Health](#), titled “State of Hispanic Health: Culture, Science, and the Environment.”

Attendees were welcomed by the sounds of a traditional Spanish guitar and were able to take away with them several healthy lifestyle books written by Delgado.

The theme of this year’s celebration was “Many Backgrounds, Many Stories ... One American Spirit.” The theme was an important one to consider, according to Richard Woychik, Ph.D., NIEHS deputy director. “Today, more than ever, Hispanic men, women, and children are shaping the American experience,” he stressed.



Collman spent time earlier in the day briefing Delgado about DERT funding initiatives. (Photo courtesy of Steve McCaw)

Gwen Collman, Ph.D., director of the NIEHS Division of Extramural Research and Training (DERT), introduced Delgado by saying, “Innovation and action have marked her career.” Delgado has written several articles that have appeared in The Wall Street Journal and The Washington Post, among others. In 2008, she was recognized by WebMD as one of four “Health Heroes” for her work and advocacy on environmental issues.

Delgado stresses health for all

“Science is at the heart of everything we do, and the community voices give science life and legs,” Delgado said, when discussing the programs and policies of the Alliance. While the Alliance focuses on health of Hispanic communities, Delgado stresses that scientists and policy makers can use the information to work toward a more inclusive view and secure health for all.

Delgado spoke on differences in culture and how a more inclusive view in health care could be carried over into most aspects of society. She spoke on the differences in perception of language and promoted the idea of a person being multilingual. According to Delgado, a person who speaks English and Spanish would be able to communicate with 85 percent of the western hemisphere and take the initial step toward understanding an alternate culture. “We want to celebrate our differences. It adds richness to our lives,” Delgado said.

Scientific expectations

Delgado reviewed several health-related studies and discussed the differences between expectations and reality. The numbers that resulted from recent studies on heart disease and life expectancy show that despite higher rates of obesity and diabetes in the Hispanic population, these people generally live longer and have fewer deaths from heart disease. Delgado warned that scientists should look at the figures objectively, before making decisions. “Our programs should be driven by data, not our expectations of what the data should be,” she urged.

Research has also shown that the incidence of cancer in the Hispanic population is significantly lower than the non-Hispanic white population. Delgado stressed that understanding these statistics can help realize the goal of quality health care for all.

NIEHS/NTP Director Linda Birnbaum, Ph.D., closed the presentation by observing, “We need more people like [Delgado] to serve as a role model in helping us break down barriers for equal opportunity.”



Delgado’s dedication to the ideal of health for all was apparent as she spoke with enthusiasm and humor. (Photo courtesy of Steve McCaw)

A warm reception at NIEHS

Prior to her departure from NIEHS, Delgado met with Woychik, NIEHS Education Outreach Specialist Ericka Reid, Ph.D., and NIH Office of Equal Opportunity and Diversity Management Institutes and Services Division Deputy Director Renee King to encourage the participation of Alliance members and affiliates in NIEHS training programs and to explore outreach opportunities in environmental health education.

NIEHS Diversity Council volunteers Brad Collins, Cynthia Radford, Eli Ney, and Veronica Godfrey Robinson greeted attendees and coordinated the reception following the seminar. NIEHS Diversity Council members also complemented the Sep 15-Oct 15 Hispanic heritage month with education materials featuring famous Hispanic Americans.

Attendees then joined other NIEHS employees for a reception featuring traditional Spanish music and refreshments.

(Melissa Kerr studies chemistry at North Carolina Central University. She is currently an intern in the NIEHS Office of Communications and Public Liaison.)



Freelancer Kristin Duke provided sign language interpretation for the talk. (Photo courtesy of Steve McCaw)



Following an NIEHS tradition, her hosts presented Delgado, center, with a copy of the poster announcing her seminar. Birnbaum, left, looked on as NIH Hispanic Employment Program Manager Gerard Roman handed the poster to Delgado. (Photo courtesy of Steve McCaw)



Afterwards, traditional Hispanic fare drew employees to the NIEHS cafeteria. (Photo courtesy of Steve McCaw)



Strolling guitarist Julius Carrasco, right, who had greeted people before the talk, joined percussionist Mike Curren to provide music for the reception. During the performance, the percussionist switched between congas and vibraphone. Both musicians live in nearby Durham, N.C. (Photo courtesy of Steve McCaw)

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Students explore career opportunities at Superfund meeting

By Rebecca Wilson

Superfund Research Program (SRP) trainees and postdocs were given a rare opportunity at this year's SRP Annual Meeting — a chance to discuss their careers with NIEHS/NTP Director Linda Birnbaum, Ph.D. Birnbaum was joined by representatives from academia and industry, and showed trainees that there are fulfilling careers beyond the bench.

More than 75 trainees and postdocs attended the panel discussion on Sunday, Oct. 23, prior to the commencement of the main meeting Oct. 24-25 in Lexington, Ky. The meeting was one of the largest yet, with more than 250 SRP grantees and stakeholders gathering to meet, share news and research results, and find new ways to collaborate.

Over the course of the discussion, passion, flexibility, and communication were named as the keys to success for young scientists launching their careers. Birnbaum advised the attendees, “Find ways to extend your skills so you are an ideal candidate. Figure out what you’re doing. Figure out how to write.”

“Don’t be an extended graduate student and worker bee,” she added. “After you complete your Ph.D. and your postdoctoral research, you can try something new. There are many opportunities out there.”

“This was an excellent message for students,” said Danielle Carlin, Ph.D., a health scientist administrator for SRP. “There are tremendous opportunities available to our trainees and I hope that they came away seeing that the world is wide open to them.”

Steve Shoemaker, a DuPont employee in the company's Corporate Remediation Group, added that even though the economy looks bleak, the jobs are coming. He pointed out that most of the workforce is over the age of 50, especially in industry. Therefore, hiring will have to occur, just to maintain the same workforce numbers.

Most of the panelists remarked that they did not spend their entire careers in one area, and many transitioned between two or even three employment sectors at some point in their careers. They told attendees that job seekers need to stay flexible and open to different opportunities. “Sometimes [career paths] don't always make a lot of sense. But if you follow your passion, then you will have a successful career,” said panelist Jerri Martin. Martin abandoned a career in research to teach, and is currently with the Kentucky Department for Environmental Protection.



Birnbaum, right, encouraged students to find ways to extend their skills to become the ideal candidate in the marketplace. Seated beside her is Carlin. (Photo courtesy Joseph Rey Au)



Eske, right, and other trainees learned that some of Birnbaum's best opportunities came through serendipity. (Photo courtesy Joseph Rey Au)

“It was refreshing to hear the panelists’ career paths,” commented Katryn Eske, a University of Kentucky doctoral student who attended the discussion. “I’m always asked what I want to do when I finish my degree, and it was good to hear that the panelists didn’t always have a specific end goal in mind early in their careers.”

The panel discussion is a first for the annual meeting, and is part of an effort to increase student participation and networking. Students also participated in a poster contest and a lunch with SRP program staff during the meeting.

(Rebecca Wilson is an environmental health information specialist with MDB, Inc., a contractor for the NIEHS Superfund Research Program and Worker Education and Training Program.)

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Foster named fellow of Academy of Toxicological Sciences

By Mamta Behl

Paul Foster, Ph.D., chief of the NTP Toxicology Branch, was notified Oct. 13 of his selection as a fellow of the [Academy of Toxicological Sciences \(ATS\)](#).

This honor represents a significant milestone in the course of a career in toxicology. Since 1981, ATS has awarded the title of fellow to certified toxicologists who are recognized by their peers for their expertise and sound scientific judgment. The purpose of this recognition and certification is to ensure the competence and experience of professionals whose work affects public welfare.

Foster is a member of a number of leading societies dealing with toxicology and reproduction, and has served on several continuing education and science program committees. He was also an officer of the Reproductive and Developmental Toxicology specialty section of the Society of Toxicology from 1997 to 2001 and president 1999-2000.

Foster has served on the editorial boards of the journal *Reproductive Toxicology*, and the publication *Birth Defects Research Part B: Developmental and Reproductive Toxicology*, and as an associate editor of the journal *Toxicological Sciences*. He is the author or co-author of more than 100 peer-reviewed publications and book chapters, as well as numerous NTP and other study reports.

Foster’s research interests include understanding the potential human health effects of environmental endocrine disruptors, the mechanisms of testicular toxicity, the study of early testicular Leydig cell dysfunction induced by chemicals as a prelude to hyperplasia and tumors, and the toxicokinetic and dynamic parameters affecting the induction of reproductive and developmental toxicity. He also has a broad interest in risk assessment issues in these areas, and currently serves as the NTP’s senior discipline expert in reproductive and developmental toxicology.

Prior to joining NIEHS in 2002, Foster was the director of the research program in endocrine, reproductive, and developmental toxicology at the CIIT Centers for Health Research, now known as The Hamner Institutes for Health Sciences.

(Mamta Behl, Ph.D., is a contractor in the NTP Toxicology Branch.)

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ATS Fellow Paul Foster (Photo courtesy of Steve McCaw)

Science Notebook

Genomics Day showcases array and sequencing resources

By Eddy Ball

Now in its third year and steadily growing, Genomics Day offered intramural researchers a chance to learn about array, sequencing, and bioinformatic resources available through NIEHS and NIH. With high-throughput resources and the output of data from genomic technologies increasing exponentially, Institute scientists are hard pressed to keep abreast of new tools and support in place at NIEHS and through the NIH Intramural Sequencing Center (NISC) in Rockville, Md.

The event Oct. 13 in Rodbell Auditorium was moderated by Kevin Gerrish, Ph.D., technical laboratory manager of the NIEHS Microarray Core (NMC) group headed by Rick Paules, Ph.D., who told the audience, “We have about twice the number of participants we had two years ago.”

As Gerrish pointed out in his introduction, Genomics Day strives to increase awareness and promote discussions of genomics; increase awareness of advances in genomic research; and increase awareness of the scope of bioinformatic support at NIEHS.

As leading-edge biomedical research increasingly uses powerful new technology to generate ever greater volumes of data, scientists need timely information and a network of support to take full advantage of these tools.

Genomics resources in action

The program opened with an overview of microarray resources by Gerrish; an overview of developments in the Next Generation (NextGen) Sequencing group, which has an advance sequencer housed at NISC, by NIEHS senior researcher Paul Wade, Ph.D.; and an introduction to resources and support for bioinformatics/biostatistics from a growing network of specialists, presented by Pierre Bushel, Ph.D., of the NIEHS Biostatistics Branch.



Gerrish, left, and Bushel watch as Hewitt presents her group's work. Hewitt said she felt fortunate for the bioinformatics and study design support she received at NIEHS. (Photo courtesy of Steve McCaw)



Godfrey's group collaborated with two studies conducted by the University of North Carolina at Chapel Hill that supplied blood samples from cancer cases and healthy controls. (Photo courtesy of Steve McCaw)

Constituting the heart of the program were presentations by six scientists, selected from the first authors of the 35 posters on display, as part of the afternoon's Genomics Day poster session. These oral presentations demonstrated the advantages of incorporating microarray and NextGen sequencing to advance research in NIEHS labs ([see text box](#)).

High volume testing and bioinformatics at NIH

The final two presentations at Genomics Day involved a guided tour of resources at NISC by [Robert Blakesley, Ph.D.](#), director of the Sequencing Group there, as well as an exploration of the applications of whole exome sequencing in cancer and rare diseases by [Jim Mullikin, Ph.D.](#), who is the center director of NISC. NIEHS is a high-volume user of NISC, especially for ChIP-Seq, RNA-Seq, and microRNA-Seq, on the center's six sequencing platforms.



Linked video:
[For a much more in-depth look at NextGen sequencing at NIH, watch presentations from the NIH conference held Sept. 28, 2011 \(06:46:52\)](#)

(Launches in new window)

Download Media Player:  Flash [E](#)

As he showed slides of the impressive equipment housed in the 7,000 square foot open-space NISC laboratory, Blakesley discussed the management challenges he faces in trying to utilize it all efficiently. "It's difficult to get them all into one picture," he said of the sheer volume of NISC resources. To keep things running smoothly, all the equipment is mobile, so clusters can be assembled, as required, for specific jobs and projects. "We want to make this a manufacturing space," he explained.

Like any automated facility, NISC relies on careful quality control software and procedures to balance computational load and disk storage, as well as barcoding everything involved in laboratory and computational analysis. The tremendous bioinformatics load is handled by a Linux cluster with a 900 terabyte disk.

One of the NISC resources that NIEHS has not been using, said Mullikin as he began his talk, is cost-effective and informative exome sequencing. This technique represents an efficient strategy to selectively sequence the coding regions of the genome, to identify novel genes associated with rare and common disorders. Over the course of his talk, Mullikin discussed three projects that illustrated the utility of exome sequencing in cancer and rare disease research.



Menendez listened to Merrick's presentation, as he waited his turn to speak. Merrick said that NTP has millions of histoglass slides and paraffin tissue blocks that may still be able to yield information for researchers. "I think there are a lot of good reasons to conduct molecular studies on archived material." (Photo courtesy of Steve McCaw)



Blakesley, right, joined Gerrish in the front row, as he waited for the afternoon session to begin. "We can certainly generate [the data]," Blakesley said as he pointed to the challenges of analyzing all that information. (Photo courtesy of Steve McCaw)

Volume at NISC is increasing, as the costs of analysis drops. “Things keep changing in the lab,” Mullikin said, pointing to the three exome sequencing platform upgrades performed since March 2010 alone, to achieve progressively greater processing capacity.



Merrick, right, and NTP biologist Molly Vallant were obviously impressed by the catalogue of NISC resources. (Photo courtesy of Steve McCaw)



Mullikin, like Merrick before him, discussed research approaches that maximize resources. (Photo courtesy of Steve McCaw)



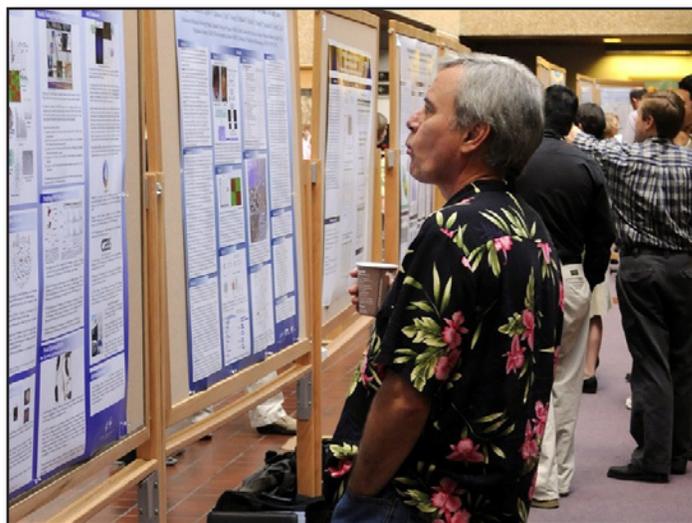
Postdoctoral fellow Sergei Nechaev, Ph.D., was animated as he talked about his study using NextGen Sequencing to study gene expression. (Photo courtesy of Steve McCaw)



Hewitt, right, listens as postdoctoral fellow Aleksandra Adomas, Ph.D., described her project, which employed ChIP-Seq and Agilent gene expression microarrays to explore the role of GATA3, a master transcriptional regulator in breast cancer. (Photo courtesy of Steve McCaw)



Postdoctoral fellow Thuy-Ai Nguyen, Ph.D., right, checked out posters during the session. Nguyen was second author on a poster from the Chromosome Stability Group. (Photo courtesy of Steve McCaw)



NMC research biologist Rick Fannin took a break from his own poster to look at his colleagues' work. (Photo courtesy of Steve McCaw)

Microarray and sequencing research highlighted at Genomics Day

- Permanent records of transient hyper-mutation in yeast and human genomes, using NextGen Sequencing, by Steven Roberts, Ph.D., postdoctoral fellow in the NIEHS [Chromosome Stability Group](#). Roberts and colleagues determined a role for single-strand DNA in the formation of mutation clusters characteristic of cancer genomes.
- Whole-genome ERalpha binding in mouse uterine tissue, using Agilent gene expression and ChIP-Seq, by Sylvia Hewitt, senior biologist in the NIEHS [Receptor Biology Group](#). Hewitt and her team identified regulatory elements controlling genes involved in regulating the estrogen response in the uterus, analyzing the data with bioinformatics support from Bushel.
- Examining miRNA expression in pre- and post-operative lung cancers, using Affymetrix miRNA microarrays, by Ashley Godfrey, Ph.D., postdoctoral fellow in the NIEHS [Molecular and Genetic Epidemiology Group](#). Godfrey and members of her group utilized support from Stella Sieber of the NMC in their search for miRNAs that show altered expression in serum, to use as the basis for a non-invasive test for recurrence in lung cancer patients.
- Use of archival paraffin tissues for qPCR gene expression: correlation with microarray data, using quantitative PCR and formalin-fixed paraffin embedded tissue, by Alex Merrick, Ph.D., head of the NTP [Molecular Toxicology and Informatics Group](#). Merrick and an NTP team of researchers explored the feasibility of mining tissues, archived by NTP from decades of animal testing, to study gene expression.
- A mutagenesis screen to identify transcriptional regulators of metallothionein in *Caenorhabditis elegans*, using NextGen sequencing, by Julie Hall, Ph.D., postdoctoral fellow in the NTP [WormTox Group](#). Hall and WormTox Group head Jonathan Freedman, Ph.D., used forward and reverse genetics in their search for transcriptional regulators of the gene *mtl-1*, which is involved in metal detoxification.
- Specific stress and non-stressed conditions can dramatically influence genomic binding and transactivation by p53 in U2OS cancer cells, using Affymetrix gene expression and ChIP-seq, by Daniel Menendez, Ph.D., staff scientist in the NIEHS [Chromosome Stability Group](#). With statistical support from members of the NIEHS [Systems Biology Group](#), Menendez' team explored the role of p53 binding and gene expression changes in non-stressed and stressed cancer cells.

NIEHS workshop tackles erionite-linked disease risk

By Eddy Ball

Erionite may not be a household word in most of the world yet, but a first-of-its-kind U.S. workshop specifically on this issue Oct. 12 at NIEHS should help raise its visibility among government and academic scientists.

Organized and chaired by NIEHS Senior Medical Advisor Aubrey Miller, M.D., with the help of his Bethesda-based colleague NIEHS Toxicology Liaison Chris Weis, Ph.D., the one-day interdisciplinary meeting gathered some 30 scientists to consider the state of the science related to erionite-induced disease and how best to advance research. Talks at the workshop ranged from the basic definition and speciation of the asbestos-like zeolite mineral, to promising strategies for prevention and treatment of the cancer that has been definitively linked to exposure in several Turkish villages, malignant mesothelioma (MM).



Linked video:
[Take a BBC video tour of Turkish cancer villages \(03:04\)](#)

(Launches in new window)

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Erionite deposits have been found in at least twelve Western states in the U.S., Miller said, raising concerns about a repeat of what happened in the Turkish cancer villages and Libby, Mont. A recent study co-authored by Miller examined the use of erionite in gravel applied to roads and parking lots in North Dakota, which could pose a potential threat that won't materialize for 20 to 50 years. According to the paper's introduction, animal tests suggest that erionite is many times more toxic than asbestos and may be the most toxic naturally occurring fibrous mineral known.

Starting with the basics

Although erionite has been listed as a known carcinogen in the NTP Report on Carcinogens since 1994, NIEHS/NTP Director Linda Birnbaum, Ph.D., explained in her welcome to attendees, "There are no regulations on erionite."

As she compared the erionite workshop to one held in 2009 on asbestos, Birnbaum cautioned attendees to look beyond what they already know about asbestos to see erionite and other fibrous minerals in a new light. She pointed to the need for answering dose-response questions, development of early biomarkers, discovery of genetic susceptibility markers, and information about possible effects distant from the lung, such as autoimmune response and gastrointestinal disorders.



In an interview with *Fairwarning* about the workshop's goals, Miller said, "At a minimum, we can begin to start to educate the public and policymakers." (Photo courtesy of Steve McCaw)



While Birnbaum enjoyed occasional comic relief, her message was serious and pointed. "Erionite is bad news," Birnbaum told the attendees, "[and] there may be other deposits not yet known." (Photo courtesy of Steve McCaw)

Weighing what we know and don't know

Scientists and officials from NIEHS, regulatory agencies, and several universities attended the workshop.

Attendees heard talks ranging from an introduction to zeolite mineralogy and morphology by U.S. Geological Survey geologist Greg Meeker and University of Iowa geological engineer [Umran Dogan, Ph.D.](#), to promising research from University of Hawaii Cancer Center (UHCC) pathologist [Haining Yang, Ph.D.](#), that has identified a protein, high-mobility group box 1 (HMGB1), that may prove to be a biomarker and therapeutic target in early stages of development of MM and work by New York University cardiothoracic surgeon Harvey Pass, M.D., who discussed his research to develop a panel of markers for MM.



The NIEHS/NTP delegation included NTP toxicologists [Matt Stout, Ph.D.](#), right, and [Scott Masten, Ph.D.](#) Seated behind them, far left, is University of North Carolina at Chapel Hill translational medicine graduate student [Eugene Gibbs](#). (Photo courtesy of Steve McCaw)



Linked video:
[Watch as Pass describes his proteomic screen for biomarkers \(09:10\)](#)

(Launches in new window)

Download Media Player:  Flash [↗](#)

Yet another promising report by UHCC Director [Michele Carbone, M.D., Ph.D.](#), described his team's discovery of a biomarker for genetic susceptibility, germline BAP1 mutations. The team's findings may help answer the question of why everyone exposed to erionite will not develop MM.



Linked video:
[Watch Carbone's description of his pioneering discoveries about susceptibility \(04:03\)](#)

(Launches in new window)

Download Media Player:  Flash [↗](#)



NIEHS clinical researcher and Acting Director of Clinical Research [Fred Miller, M.D., Ph.D.](#), called on his colleagues to explore the connection between erionite exposure and the more common immunological diseases. (Photo courtesy of Steve McCaw)

Looking ahead

When he opened the workshop Miller talked about two major objectives — getting participants on the same page in respect to the science about erionite, and trying to identify some steps to move the needed research and public health discussions forward among the participating scientists and their organizations. While the objectives were somewhat lofty for a first meeting, by the end of the meeting this diverse group of scientists had worked through a large amount of information and were making some shorter-term recommendations for next steps to be taken.

For example, there was general agreement with respect to the need to update old maps regarding the locations of erionite deposits in the US, as well as to further evaluate known locations. Also, researchers identified the need

for standardized mineral identification, sampling, and analysis strategies that can be used across sites to better understand mineral compositional variability and associated exposures.

The issue of mixtures came up several times, and Birnbaum suggested opening a dialogue with the nanomaterials research community to see if findings about engineered particles shed any light about natural ones. She also said that indoor exposures need further study. Lastly, there was broad support for raising public awareness about the potential hazards associated with erionite exposure. “At a minimum, just having this meeting has elicited a public health response,” Miller concluded.

Citations:

Carbone M, Baris YI, Bertino P, Brass B, Comertpay S, Dogan AU, Gaudino G, Jube S, Kanodia S, Partridge CR, Pass HI, Rivera ZS, Steele I, Tuncer M, Way S, Yang H, Miller A. 2011. Erionite exposure in North Dakota and Turkish villages with mesothelioma. Proc Natl Acad Sci U S A 108(33):13618-13623.

Testa JR, Cheung M, Pei J, Below JE, Tan Y, Sementino E, Cox NJ, Dogan AU, Pass HI, Trusa S, Hesdorffer M, Nasu M, Powers A, Rivera Z, Comertpay S, Tanji M, Gaudino G, Yang H, Carbone M. 2011. Germline BAP1 mutations predispose to malignant mesothelioma. Nat Genet 43(10):1022-1025.



A participant of relatively few words during most of the workshop, Cmdr. Danielle DeVoney, Ph.D., used them well toward the end as she urged colleagues to include the entire family of fiber zeolites in their research and avoid building an asbestos-like box around erionite. DeVoney was part of the U.S. Environmental Protection Agency’s team working on Libby amphibole asbestos. (Photo courtesy of Steve McCaw)

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As one of the Institute’s leading toxicologists, Weis played an important role at the workshop by moderating the session on exposure assessment. To a greater degree even than other exposures, it is far better to prevent erionite exposure than to try to treat resulting diseases. (Photo courtesy of Steve McCaw)



University of North Dakota pathologist Mary Ann Sens, M.D., Ph.D., reported on North Dakota’s Autopsy and Tissue Program and Surveillance Efforts. (Photo courtesy of Steve McCaw)



University of Cincinnati professor James Lockey, M.D., argued that states need to identify where the erionite is and take measures to protect people without delay. “We have enough information now to take steps,” he said. (Photo courtesy of Steve McCaw)

Workshop confronts challenges of mixtures research

By Robin Mackar

Improving how research on mixtures of chemicals is conducted is a theme being discussed at meetings across several continents, but the Sept. 26-27 NIEHS “Advancing Research on Mixtures” workshop in Chapel Hill, N.C. really brought the issue front and center by marshalling leading experts to address this enormous challenge.

During welcoming remarks, John Bucher, Ph.D., director of the NIEHS Division of the National Toxicology Program (DNTP), emphasized that research on mixtures has to be attacked with a new path and pace. Bucher said, from a toxicology perspective, “[It is the] bravest of the brave of us who were trying to tackle mixtures research, but it’s time to tap into our new understanding of this problem, take advantage of new technologies, and really ask ourselves what we can do to advance this field” — a sentiment echoed throughout the meeting.

Broad-based perspectives

“This workshop is designed to help not only the NIEHS intramural and extramural divisions develop a mixtures research strategy, but other scientific communities, as well,” said workshop co-chair Cynthia Rider, Ph.D., of the DNTP, as she kicked off the meeting.

The first morning was filled with insightful talks that brought everyone up to speed on the current approaches and some of the major challenges in a variety of disciplines ([see text box](#)).

Co-chair Danielle Carlin, Ph.D., from the NIEHS Division of Extramural Research and Training (DERT), thanked the speakers and led the charge for the five breakout sessions aimed at developing and ranking a comprehensive, discipline-based list of knowledge gaps in mixtures research. Representatives from DERT, NTP, and the NIEHS Division of Intramural Research (DIR) participated in each of the workgroups.



Rider, left, and Carlin brought the expertise of their divisions, DNTP and DERT, to successfully organize the NIEHS Workshop “Advancing Research on Mixtures: New Perspectives and Approaches for Predicting Adverse Human Health Effects” at the Sheraton Chapel Hill Hotel. (Photo courtesy of Steve McCaw)



Price’s presentation on day one of the mixtures workshop left no doubt that he knows a thing or two about developing models to assess exposure to multiple chemicals. (Photo courtesy of Steve McCaw)



Toxicologist Raymond Yang, Ph.D., now at Colorado State University, offered much input about how to apply computer applications to toxicology throughout the two-day meeting. He appeared to be enjoying his time visiting with his former colleagues at NIEHS/NTP. (Photo courtesy of Steve McCaw)

Multidisciplinary focus

Linda Birnbaum, Ph.D., NIEHS/NTP director, opened the second day with some inspirational words. “We live in a world of mixtures. We can’t keep looking at one chemical at a time,” said Birnbaum. “We have so many great minds gathered here. Let’s try to think outside the box. Let’s use our interdisciplinary expertise to get this field moving forward.”

Plenary sessions the second day focused on innovative approaches for studying mixtures (see text box).

Claudia Thompson, Ph.D., of DERT, provided the charge for multidisciplinary breakout sessions that were each given a key topic in mixtures research. Topics included modeling mixture toxicity, making better use of exposure data, integrating ideas from toxicology and epidemiology, using high-throughput approaches to assess chemical interactions, and consideration of mixtures across time.

Next steps

NIEHS Deputy Director Rick Woychik, Ph.D., closed the meeting by talking about next steps. He provided an update on the NIEHS strategic planning process and showcased how the themes heard throughout the mixtures meeting dovetail with many themes emerging in the strategic planning process.

Better technologies for characterizing mixtures, such as furthering the development of subdermal chips and iPhone apps, developing innovative strategies for analyzing and modeling the biological effects of mixtures from both a bottom-up and top-down approach, and looking at total exposure, including all routes, sources, and chemicals, both inside and outside the body, are some of the themes Woychik mentioned coming out across sessions.

“Now is the prime time to be working your research recommendations into our strategic planning process,” Woychik said. He also mentioned that a workshop report will be prepared.

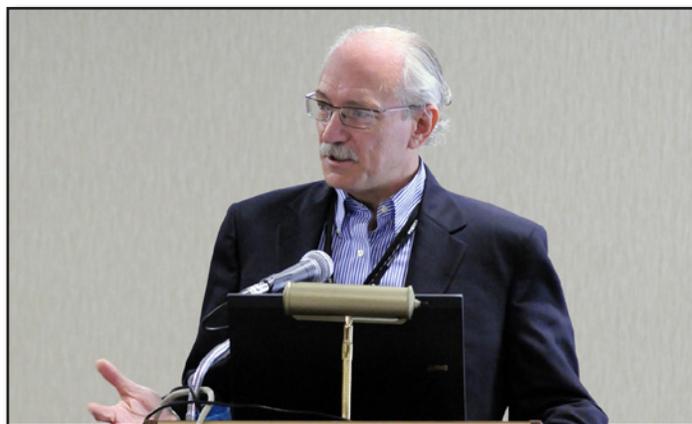
(Robin Mackar is the news director in the NIEHS Office of Communications and Public Liaison.)



Birnbaum, left, and Nigel Walker, Ph.D., DNTP deputy division director for science, listened intently as speakers offered their perspectives on how to advance research on mixtures. (Photo courtesy of Steve McCaw)



Representatives from other federal agencies, including Moiz Mumtaz, Ph.D., from the Centers for Disease Control and Prevention Agency for Toxic Substances and Disease Registry, were invited to provide input as NIEHS works to develop a crosscutting mixtures research strategy. (Photo courtesy of Steve McCaw)



Woychik not only provided input throughout the workshop, but also gave closing remarks, which summarized some of the major themes emerging across the breakout sessions. He stressed that NIEHS would incorporate the information gained at the meeting in the future NIEHS mixtures research agenda. (Photo courtesy of Steve McCaw)

Workshop speakers

Day one:

- Glenn Rice, Ph.D., a risk assessment expert at the U.S. Environmental Protection Agency (EPA), described whole mixture and component-based risk assessment approaches, and highlighted data needs, including increased chemical analysis of complex mixtures and more work at environmentally relevant dose levels.
- Paul Price, from The Dow Chemical Company, provided an overview of mixtures issues from the exposure science perspective. He emphasized the need to use exposure data in the design of toxicological and epidemiological studies and the use of new modeling tools to prioritize mixtures for study.
- Earl Gray, Ph.D., a reproductive biologist and toxicologist at EPA, encouraged researchers to start shifting away from looking at mechanisms of individual chemicals, to focusing more on target pathways and tissues affected by multiple chemicals.
- David Christiani, M.D., of Harvard University, provided the epidemiological perspective, by showcasing examples where epidemiologists are already contributing to mixtures research, including papers about the Tar Creek Superfund Site, and research on air pollutants and mortality, where the exposures are known, but the effects on populations are not fully understood.
- Chris Gennings, Ph.D., of Virginia Commonwealth University, discussed the role that statistical approaches can play in predicting the toxicity of chemical mixtures. She described some of her recent work to assess sufficient similarity of complex mixtures.

Day two:

- Paige Tolbert, Ph.D., of Emory University, discussed the use of multipollutant models in epidemiological studies of air pollution.
- Andreas Kortenkamp, Ph.D., of the University of London, emphasized the need for toxicologists and epidemiologists to work together to solve mixtures challenges.
- Chirag Patel, Ph.D., of Stanford University, presented a novel approach for linking exposure to disease through the use of environment-wide association studies.

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Superfund study shows arsenic mitigation strategies effective

By Rebecca Wilson

Water from deep wells can be made safer from arsenic contamination by limiting how much water is pumped. This important new finding is based on an investigation of well usage in Bangladesh, a country known for large-scale arsenic poisoning, and has relevance in the U.S. where millions depend on private wells for drinking water.

In a [study](#) funded by the NIEHS Superfund Research Program (SRP), lead author [Kathleen Radloff, Ph.D.](#), and her co-authors at Columbia University, the University of Delaware, and the University of Dhaka, Bangladesh, found that when water demand in Bangladesh was restricted to household use, the risk of

contamination was significantly less than when irrigation water was also pumped from the deep aquifer. Increased pumping of deep groundwater can lead to the intrusion of arsenic-laden water from a shallower aquifer above.

The need for better monitoring

Elevated arsenic concentrations are common in wells across South and Southeast Asia, and their role as a primary source of drinking water has led to extensive arsenic poisoning in the region. To lower exposure, the use of deep-water wells, often drilled to depths of 500 feet or greater, has increased considerably. However, Radloff is concerned that the additional strain on deep aquifers is leading to higher levels of contaminants.

“Increasing water demand, such as for irrigation purposes, means that the water that remains in the ground is more likely to become contaminated,” said Radloff in a [press release](#) issued by the Lamont-Doherty Earth Observatory at Columbia University. “Where water demands are increasing, monitoring of water supplies also needs to increase — not only in Bangladesh, but also in the U.S.”

Furthermore, the researchers discovered that arsenic concentrations in deep aquifers declined over time, in a process called adsorption, where the arsenic attaches to naturally occurring sediments. This was revealed when arsenic-rich water was injected into a deep aquifer in Bangladesh. Within 24 hours, the researchers found that arsenic concentration had fallen by 70 percent, and continued to decline over a nine-day monitoring period.

Implications for well water in the U.S. and elsewhere

“This research carries far-reaching public health significance, not just for the people of Bangladesh, but also for those affected globally by arsenic exposure,” said William Suk, Ph.D., director of the SRP. The United States Geological Survey reports that 43 million Americans depend on unregulated private wells for their drinking water, and nearly a quarter of this country’s wells have at least one contaminant that exceeds levels considered safe by the U.S. Environmental Protection Agency (EPA), including arsenic. The EPA also reports that arsenic is the second most common contaminant at Superfund sites.

According to Radloff, the effects of this contamination are more apparent in Bangladesh, where the concentrations are higher, but the same processes can occur in the United States. “Our estimates can be applied to aquifers with similar geochemical characteristics here in the U.S.,” she said. She cited the Mahomet aquifer in east-central Illinois as an example. “Farming demands have drastically altered water flow conditions and there are good reasons to expect arsenic concentrations might change more than they have in the past.”



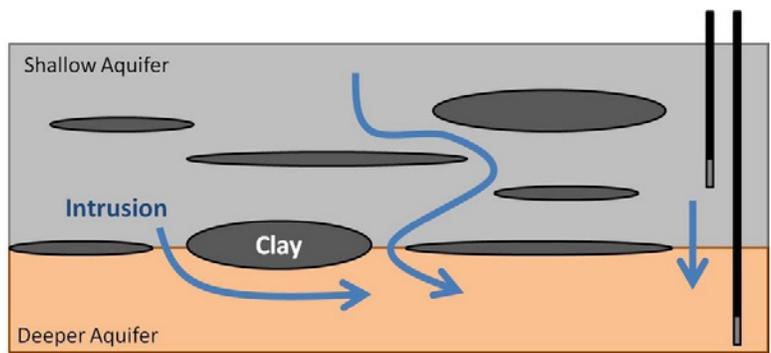
First author Kathleen Radloff is one of several NIEHS-supported scientists at Columbia University whose research is helping reduce arsenic poisoning in Bangladesh, by limiting exposure at the source through education and intervention. (Photo courtesy of Kathleen Radloff)



The use of shallow wells with elevated arsenic concentrations in Bangladesh and other parts of South and Southeast Asia has led to large-scale arsenic poisoning. Here, drillers assist the research team with building sampling wells. Local crews have been working with the team for more than a decade. (Photo courtesy of Kathleen Radloff)

Radloff, who completed her doctorate in Earth and Environmental Engineering at Columbia University, is now an environmental engineer for the private consulting company Gradient.

Citation: Radloff KA, Zheng Y, Michael HA, Stute M, Bostick BC, Mihajlov I, Bounds M, Huq MR, Choudhury I, Rahman MW, Schlosser P, Ahmed KM, van Geen A. 2011. Arsenic migration to deep groundwater in Bangladesh influenced by adsorption and water demand. Nat Geosci; doi:10.1038/ngeo1283 [Online 9 October 2011].



Contaminated water in a shallow aquifer can penetrate into the deeper aquifer. Limiting water usage can reduce arsenic concentrations, by letting natural remediation take its course and slowing intrusion. (Diagram courtesy of Kathleen Radloff)

(Rebecca Wilson is an environmental health information specialist with MDB, Inc., a contractor for the NIEHS Superfund Research Program and Worker Education and Training Program.)

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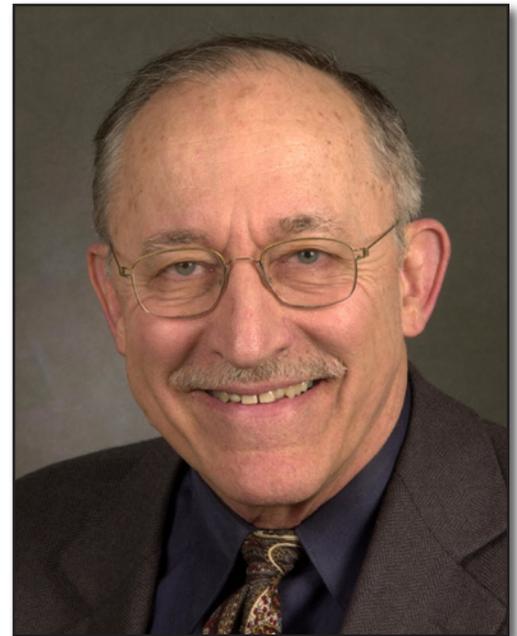
Grollman takes top award at EMS meeting

By Eddy Ball

NIEHS grantee Arthur Grollman, M.D., received this year's EMS Award Oct. 18 at the [Environmental Mutagen Society \(EMS\) 42nd Annual Meeting](#) in Montreal. As part of his honor, Grollman presented a lecture on "Human Exposure: Unraveling the Mystery of a Global Environmental Disease," reporting on the latest developments in his quest to understand aristolochic acid-induced kidney damage and upper urothelial cancers (UUC).

[Grollman](#) is Distinguished Professor of Pharmacological Sciences, Evelyn G. Glick Professor of Experimental Medicine, and director of the Zickler Laboratory of Chemical Biology at the State University of New York at Stony Brook. As a result of research by him and his colleagues in the U.S. and Europe, Grollman said in a 2010 interview, "Aristolochic acid ... now joins aflatoxin and vinyl chloride as established human chemical carcinogens with distinct TP53 mutational signatures."

With his award, Grollman joins a distinguished list of scientists honored with the [EMS Award](#) since 1972, in recognition of outstanding research contributions in the area of environmental mutagenesis. The list includes NIEHS lead researcher Samuel Wilson, M.D., last year ([see story](#)), grantee Leona Samson, Ph.D., in 2001, and lead researcher Thomas Kunkel, Ph.D., in 1997.



Grollman is director of the [Laboratory of Chemical Biology](#) at Stony Brook University. He is a member of NIEHS' Environmental Health Sciences Review Committee and a former member of the Board of Scientific Counselors. (Photo courtesy of Arthur Grollman and Stony Brook University)

Endemic nephropathy in the Balkans

The author of more than 200 peer-reviewed papers, Grollman began his research on the herb *Aristolochia*, and its link to kidney failure and urothelial cancer in 2005, with an epidemiological study of people with endemic nephropathy in Croatia, one of several areas in the Danube river basin where chronic renal disease is endemic.

Further investigations provided more evidence that exposure to *Aristolochia*, as a consequence of consuming contaminated wheat grain from cultivated fields where *Aristolochia* grows wild, is strongly associated with increased risk of developing the disease. Because this herb, which grows worldwide, is also used by millions of people as a medicine, diseases linked to it constitute a major global public health problem.

Since his initial publication on *Aristolochia*, Grollman has given many talks on the subject, including one last year ([see story](#)), and published eight additional papers on aristolochic acid-induced disease. Grollman extended his epidemiological findings to include metabolic and genetic studies. His latest research, currently in press for the journal *Kidney International*, describes a robust biomarker of exposure to aristolochic acid and a specific biomarker characteristic of aristolochic acid-induced UUC. Its findings were the basis of his EMS Award lecture.

Studies of human tissues

Grollman and his team of researchers extracted DNA from renal cortex and tumor tissue of 67 residents, from regions known to harbor endemic nephropathy, who had undergone nephroureterectomy for UUC. They then compared their findings with results from a cohort of 10 individuals with UUC from nonendemic areas, who served as controls.

The team tested for the presence of aristolactam (AL)-DNA adducts, which concentrate in the renal cortex. AL-DNA adducts are formed by the reaction of aristolochic acid with genomic DNA. They also tested for unique mutations in TP53, a tumor-suppressor gene, which Grollman and colleagues established as a biomarker for aristolochic acid nephropathy with a study published in September ([see story](#)).

They found that AL-DNA adducts were present in 70 percent of endemic cases of UUC patients, and in 94 percent of patients who carried these specific mutations in TP53, neither of which were detected in patients with UUC residing outside of this region. Their results provide molecular epidemiologic evidence that in genetically susceptible individuals, dietary exposure to aristolochic acid is causally related to endemic nephropathy and UUC.

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EMS honors NIEHS-funded researcher

By Ian Thomas

The Environmental Mutagen Society (EMS) has selected “Effects of PON polymorphisms and haplotypes on molecular phenotype in Mexican-American mothers and children,” a study from Karen Huen, Ph.D., as its top publication of 2011 from a student or new investigator. Backed by joint funding from NIEHS and the U.S. Environmental Protection Agency (EPA), the [study](#) explores the genetic differences between Mexican-American and Caucasian mothers and children with regard to the effects of paraoxonase (PON), a protective metabolic enzyme that can detoxify some organophosphate pesticides (OPs).

“I’m sincerely grateful to EMS for continuing to recognize and encourage the work of new investigators like myself,” said Huen, an assistant researcher with the [Center for Children’s Environmental Health Research](#)

at the University of California (UC), Berkeley and the paper's first author. "It's an incredible honor to receive this award."

Nina Holland, Ph.D., the study's lead researcher, credited her fellow scientists from UC Berkeley for much of the project's success. Study participants were drawn from the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS), a longitudinal birth cohort study funded by a grant from NIEHS.

"None of this would have been possible without the hard work and dedication of our fellow investigators, students, and staff at the Center for Environmental Research and Children's Health (CERCH), some of whom have followed this cohort for more than 10 years."

Linking age and ethnicity to disease susceptibility

By resequencing PON genes in 30 children and mothers from the Salinas Valley in California, followed by high-throughput genotyping and haplotype analyses for more than 400 mother-child pairs, Huen and her team identified a total of 90 genetic variants, many of which were novel, functionally significant, and noticeably varied from their Caucasian counterparts.

"Initially, we expected to see the effects of some PON genetic polymorphisms on the quantity and efficiency of organophosphate detoxification," explained Holland. "In the end, we found that, in the case of exposure, children in some populations remain more vulnerable than adults until nearly 9 years of age, [and] some of them may be more than 50 times more susceptible than others due to their genetic makeup."

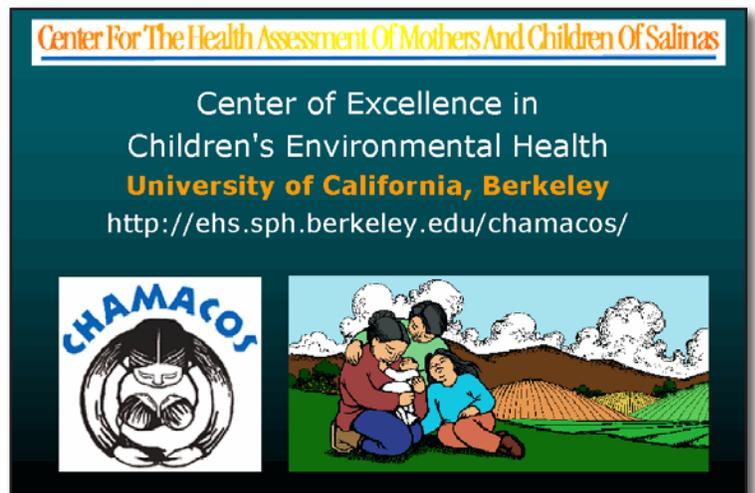
The whole picture

While the results of this study clearly indicate that PON status can influence levels of susceptibility among various population and age groups, Huen and Holland are quick to point out that several additional factors should be examined when evaluating new ways to protect the public from pollutants like OPs.

"Many emerging public health problems, such as childhood obesity and neurodevelopment issues, may be the result of prenatal or adolescent exposures to environmental pollutants," Holland explained. "At the same time, it's also essential for future research to factor additional parameters, such as diet and lifestyle, when determining the overall impact on the health of a given population."



Holland, left, and Huen are shown at the UC Berkeley graduation ceremony in 2009. (Photo courtesy of Karen Huen)



A collective effort

Still, researchers insist that joint partnerships between like-minded organizations will ultimately be the key to beneficial research moving forward.

“This is the age of genomics and personalized medicine,” Holland observed. “Partnerships, like the one between NIEHS and EPA which funded this study, will be crucial in producing the kind of research that can actually shape policy and protect children and pregnant women from the harmful effects of substances such as OPs.”

Since its founding in 1969, EMS has been dedicated to the promotion of critical research into the causes and consequences of damage to the genome and epigenome, for the purpose of ensuring a healthy, sustainable environment for future generations. Visit the EMS website to learn more.

Citation: [Huen K](#), [Barcellos L](#), [Beckman K](#), [Rose S](#), [Eskenazi B](#), [Holland N](#). 2011. Effects of PON polymorphisms and haplotypes on molecular phenotype in Mexican-American mothers and children. *Environ Mol Mutagen* 52(2):105-116.

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

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Crystallography reveals roots of DNA repair-linked neurodegenerative disease

By *Robin Arnette*

According to [R. Scott Williams, Ph.D.](#), the proteins that repair DNA are like the molecular sentinels that home in on damaged DNA and protect cells from environmental damage. He said oftentimes these same proteins are mutated in heritable neurodegenerative diseases and syndromes that predispose a person to cancer. When Williams came to NIEHS a year and a half ago, he focused on understanding these connections.

Williams and his research team determined how a protein known as aprataxin functions in yeast. Aprataxin participates in the repair of damaged DNA in humans, and mutations in the gene that encodes aprataxin (*APT*X) cause hereditary neurological disorders. Until recently, scientists didn't understand how aprataxin protected DNA or how the gene mutations shut down the protein. Williams and his colleagues uncovered how aprataxin recognizes and directly reverses DNA damage using X-ray crystallography. The results appeared online in the Oct. 9 issue of the journal *Nature Structural and Molecular Biology*. The findings have implications for human health.

Aprataxin reverses DNA damage

Williams explained that the final critical step in repairing damaged DNA is called ligation, which involves chemically joining broken



Percy Tumbale, Ph.D., is a postdoctoral fellow in Williams' lab and is lead author on the paper. She is a 2012 Fellows Award for Research Excellence winner. (Photo courtesy of Steve McCaw)

strands of DNA together. Like many biological processes, ligation can fail when DNA ligases attempt to link normal DNA strands with strands that have been modified as a result of environmental DNA damage. Such failure results in the production of additional DNA damage called DNA adenylates. Aprataxin acts as a DNA ligase proofreader by repairing DNA adenylates, but mistakes in the protein can have deleterious effects in humans. Williams said mutations in aprataxin lead to deterioration in the cerebellum and a debilitating disorder known as ataxia with oculomotor apraxia type1 (AOA1).

“Although we have known that *APTX* mutations cause AOA1 for nearly a decade, researchers have not understood the molecular underpinning of how aprataxin works, or how mutations stop it from protecting our DNA,” he said. “Now, we have a hypothesis for how a number of different types of heritable mutations in aprataxin cause its inactivation and lead to AOA1.”

The Williams team took advantage of the high-throughput robotics infrastructure at NIEHS in the Laboratory of Structural Biology, to screen a large number of crystallization conditions for aprataxin bound to DNA. In a technical triumph, the group did something that’s never been done before — crystallize a quaternary complex of the protein containing aprataxin, DNA, the DNA damage lesion 5’-adenosine monophosphate (AMP), and the metal cofactor zinc. Because Williams captured a molecular snapshot of aprataxin in action, he was able to rationalize how it recognizes and excises DNA damage.

“That’s one of the beauties of structural biology,” Williams added. “By directly visualizing proteins and their complexes at work, you always gain critical insights into the functions of macromolecules that you’d never get using other methods.”

Cancer therapy and novel drug design

Figuring out how aprataxin fixes DNA ligation errors may also lead to potential advances in cancer research. Williams said that proteins involved in DNA repair are the Achilles’ heel of rapidly dividing cancer cells. He believes that if scientists can target aprataxin with therapeutics, they may be able to augment standard cancer therapy regimens. The aprataxin work also provides a template that may be used for the development of small molecule compounds that zero in on and inhibit this enzyme class in humans.

Future work

Williams said that several different adducts, or cancer-causing molecules that chemically modify DNA, lead to ligation errors and adenylated DNA. He wants to find out which adduct is the most important one for aprataxin. In other words, are there certain types of damage that illicit a repair response from aprataxin? If so, how does that damage relate to the mechanism of neurodegenerative disease? Williams performed his experiments on the yeast version of aprataxin, but is currently extending his studies to work on the human form.

Citation: [Tumbale P, Appel CD, Kraehenbuehl R, Roberson PD, Williams JS, Krahn J, Ahel I, Williams RS. 2011. Structure of an aprataxin-DNA complex with insights into AOA1 neurodegenerative disease. Nat Struct Mol Biol; doi:10.1038/10.1038/nsmb.2146 \[Online 9 October 2011\].](#)



Williams is head of the Genome Stability Structural Biology Group within the Laboratory of Structural Biology at NIEHS. (Photo courtesy of Steve McCaw)

High pesticide exposure associated with cognitive decline

By Robin Arnette

Farmers routinely apply pesticides to crops, but this common occurrence can sometimes result in farmers being exposed to the chemicals. Although these accidental exposures don't propel farmers to seek medical attention, they still may have long-term health consequences. That's why researchers are now focusing on these high pesticide exposure events or HPEEs to better understand how they impact human health.

According to new research from scientists at NIEHS, the University of Iowa, and the National Cancer Institute, HPEEs may be a cause for concern. In a paper published [online](#) in the International Archives of Occupational and Environmental Health, agricultural workers who had at least one HPEE involving pesticides that contain organophosphate scored lower on cognitive tests compared to agricultural workers who never had an HPEE.

"We know that if a person suffers pesticide poisoning there may be long-term cognitive consequences, but our study shows that you don't need to be poisoned to have effects," said [Jane Hoppin, Sc.D.](#), a staff scientist in the NIEHS Epidemiology Branch and co-author of the study. "About 23 percent of these farmers in the Agricultural Health Study reported having an HPEE in their lifetime, so HPEEs are important exposures that haven't been considered."

Brain games

Hoppin said she and her colleagues recruited 693 men out of approximately 52,000 pesticide applicators who were enrolled in the [Agricultural Health Study \(AHS\)](#), a study sponsored by several federal agencies to examine health changes in licensed pesticide applicators and their spouses from North Carolina and Iowa. To evaluate central nervous system (CNS) function, trained technicians administered nine neurobehavioral tests to the men to assess memory, motor speed, sustained attention, verbal learning, and visual scanning and processing.

Participants with an HPEE and those without had similar scores on seven of the nine tests, but subtle differences on two tests got the researchers' attention. Participants who had reported an HPEE were 4.2 seconds slower on the Digit-Symbol Test and 2.5 seconds slower on the Sequences A test ([see text box](#) for more information).

[Fred Gerr, M.D.](#), a professor in the Department of Occupational and Environmental Health at the University of Iowa College of Public Health and a co-author on the paper, was responsible for conducting the neurobehavioral tests. He said the tests the researchers used



Hoppin said, "I was surprised that we could see any difference with HPEEs, because they're very non-specific and it's a self-reported exposure. If we had better detail, such as whether they got it on their clothing, on their skin or in their lungs, and knew what pesticides were involved, we may be able to find a larger neurological difference." (Photo courtesy of Steve McCaw)



Gerr said that the research collaboration created a synergy that was based upon the strength of the AHS, Hoppin's epidemiological expertise, and his group's experience with the administration of neurobehavioral tests. (Photo courtesy of the University of Iowa College of Public Health)

measured a wide range of distinct mental abilities and, in the absence of severe brain injury, it is uncommon to see lower scores on all tests administered.

He added, “Broadly speaking, the two tests affected by HPEEs both assess visual scanning and mental processing of information.”

Pesticides and human health

Hoppin admits, however, that the research had several limitations. With 693 participants, the study was fairly small. Also, these volunteers were exposed to a broad range of pesticides and exposure levels, making it difficult to determine what aspect of the HPEE actually contributed to lower test scores. It could have been the active ingredient in the pesticide or one of the many other chemicals that comprise the 95 percent of inert material. Nevertheless, the findings indicated that HPEEs sped up the cognitive decline that humans experience, equivalent to the effect of being 3.9 years older.

Although the results are of vital importance to agricultural workers who handle pesticides, Hoppin stressed that people who use over-the-counter pesticides in their homes shouldn’t extrapolate the study’s findings to residential use. This research was specific to licensed pesticide applicators working with organophosphate pesticides. However, all individuals should use care and read the label when handling and working with pesticides.

In future work, the research team will investigate how exposure to specific pesticides impacts neurobehavioral function, and whether these exposures affect human disease. For instance, Hoppin said, additional studies from the AHS revealed that people with HPEEs are more likely to have asthma.

“This current work adds to our body of knowledge about the effects of pesticides,” Hoppin said.

Citation: [Starks SE, Gerr F, Kamel F, Lynch CF, Alavanja MC, Sandler DP, Hoppin JA](#). 2011. High pesticide exposure events and central nervous system function among pesticide applicators in the Agricultural Health Study. *Int Arch Occup Environ Health*; doi: 10.1007/s00420-011-0694-8 [Online 7 September 2011].

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Neurobehavioral testing

The nine examinations included the Continuous Performance Test, Digit-Symbol Test, Finger Tapping, Grooved Pegboard, Auditory Verbal Learning Test (AVLT) Total Recall, AVLT Delayed Recall, AVLT Recognition, Sequences A, and Sequences B. The tests took place in private rooms and were timed. The two tests in which agricultural workers with an HPEE scored lower are described below.

Digit-Symbol Test

Designed to measure visual scanning and processing, the test used a code of nine symbols, for example, \$, %, @, with a number underneath each symbol. When volunteers saw a symbol-number combination flash on their computer monitor, they were supposed to type the number on the keyboard.

Sequences A

Designed to measure visual scanning and motor speed, the test consisted of a map that had the letters of the alphabet randomly dispersed throughout. The volunteers were supposed to find the letters in order, starting with the letter A.

Collaboration yields important findings for lung function

By Robin Arnette

By combining two large genome-wide association studies (GWAS), a team of researchers has found 16 new loci or specific locations on genes that are responsible for determining proper lung function. The results came from the more than 48,000 individuals who participated in SpiroMeta, a European-based consortium, and [Cohorts for Heart and Aging Research in Genomic Epidemiology \(CHARGE\)](#), a consortium based in the U.S. The results appeared [online](#) Sept. 25 in the journal Nature Genetics.

“The finding basically opens doors into pulmonary pathophysiology,” said NIEHS senior researcher [Stephanie London, M.D., Dr.P.H.](#), co-author on the paper and an organizer for the pulmonary function group within the CHARGE Consortium. “It allows us to study what could go wrong in the lung, as well as understand normal lung development.”

The research team prevented experimental duplication and produced twice as much data by putting both consortia together. London explained that increasing the sample size boosted statistical power and enabled the scientists to find things they wouldn’t have ordinarily found in their half of the data.

Take a deep breath

London said the team used a machine that measured two parameters that are standard clinically used methods for testing normal lung function. Participants were instructed to breathe in and blow out into the machine as hard as they could. The amount exhaled in the first second was the first parameter called forced expiratory volume in one second or FEV1. When participants kept blowing until they couldn’t blow anymore, the researchers had a measure of the total amount of exhaled air called forced vital capacity, or FVC.

The data set contained approximately 2.5 million single nucleotide polymorphisms (SNPs) from subjects participating in one of 23 epidemiological studies. The highest ranking SNPs in the top loci underwent follow-up replication studies. The resulting 16 novel gene loci are important, according to London, because they expand the list of gene targets involved in determining normal or abnormal lung function.

Although the results represent a substantial leap in pulmonary research, today’s lung specialists aren’t going to put this work into practice just yet.



London holds dual appointments in the NIEHS Epidemiology Branch and the Laboratory of Respiratory Biology. (Photo courtesy of Steve McCaw)



Joubert is a research fellow in the Epidemiology Branch. (Photo courtesy of Steve McCaw)

“From a clinical point of view, these are modest size effects,” London added, “but the doctors of the future might prescribe medications for pulmonary disease based on knowledge that could come out of these discoveries.”

Epidemiology research on a global scale

London said large collaborations can generate a wealth of worthwhile information, but many people don’t realize the amount of work that goes into one of these projects. One of the main points is having a high level of coordination, not just between lots of groups, but also between individuals within these groups. More than 150 authors appear on the article, with each of them playing a role in generating, analyzing, or interpreting the data (see text box for more information).

One of these researchers, Bonnie Joubert, Ph.D., is a research fellow in London’s group. Joubert considers herself fortunate to have worked with so many talented scientists. She said, “It is a privilege to be involved in a consortium of this size and scope because it offers important contributions to the fields of genetic epidemiology and respiratory disease.”

London agreed that the final results were well worth the time and financial resources it took to produce them.

“Sometimes you hear scientists say, ‘We spent all this money on GWAS and what have we really learned?,’” London said. “This research is an example in which we’ve really learned a lot from GWAS.”

Citation: Artigas MS, Loth DW, Wain LV, Gharib SA, Obeidat M, Tang W, Zhai G, Zhao JH, Smith AV, Huffman JE, Albrecht E, Jackson CM, Evans DM, Cadby G, Fornage M, Manichaikul A, Lopez LM, Johnson T, Aldrich MC, Aspelund T, Barroso I, Campbell H, Cassano PA, Couper DJ, Eiriksdottir G, Franceschini N, Garcia M, Gieger C, Gislason GK, Grkovic I, Hammond CJ, Hancock DB, Harris TB, Ramasamy A, Heckbert SR, Heliövaara M, Homuth G, Hysi PG, James AL, Jankovic S, Joubert BR, Karrasch S, Klopp N, Koch B, Kritchevsky SB, Launer LJ, Liu Y, Loehr LR, Lohman K, Loos RJ, Lumley T, Al Balushi KA, Ang WQ, Barr RG, Beilby J, Blakey JD, Boban M, Boraska V, Brisman J, Britton JR, Brusselle GG, Cooper C, Curjuric I, Dahgam S, Deary IJ, Ebrahim S, Eijgelsheim M, Francks C, Gaysina D, Granel R, Gu X, Hankinson JL, Hardy R, Harris SE, Henderson J, Henry A, Hingorani AD, Hofman A, Holt PG, Hui J, Hunter ML, Imboden M, Jameson KA, Kerr SM, Kolcic I, Kronenberg F, Liu JZ, Marchini J, McKeever T, Morris AD, Olin AC, Porteous DJ, Postma DS, Rich SS, Ring SM, Rivadeneira F, RoCHAT T, Sayer AA, Sayers I, Sly PD, Smith GD, Sood A, Starr JM, Uitterlinden AG, Vonk JM, Wannamethee SG, Whincup PH, Wijmenga C, Williams OD, Wong A, Mangino M, Marciante KD, McArdle WL, Meibohm B, Morrison AC, North KE, Omenaas E, Palmer LJ, Pietiläinen KH, Pin I, Pola Sbreve Ek O, Pouta A, Psaty BM, Hartikainen AL, Rantanen T, Ripatti S, Rotter JI, Rudan I, Rudnicka AR, Schulz H, Shin SY, Spector TD, Surakka I, Vitart V, Völzke H, Wareham NJ, Warrington NM, Wichmann HE, Wild SH, Wilk JB, Wjst M, Wright AF, Zgaga L, Zemunik T, Pennell CE, Nyberg F, Kuh D, Holloway JW, Boezen HM, Lawlor DA, Morris RW, Probst-Hensch N; The International Lung Cancer Consortium; GIANT consortium, Kaprio J, Wilson JF, Hayward C, Kähönen M, Heinrich J, Musk AW, Jarvis DL, Gläser S, Järvelin MR, Ch Stricker BH, Elliott P, O’Connor GT, Strachan DP, London SJ, Hall IP, Gudnason V, Tobin MD. 2011. Genome-wide association and large-scale follow up identifies 16 new loci influencing lung function. *Nat Genet*; doi:10.1038/ng.941 [Online 25 September 2011].

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More NIEHS connections

In addition to London and Joubert, two other researchers on the author list have ties to NIEHS. Dana Hancock, Ph.D., is a former postdoctoral fellow in the NIEHS Epidemiology Branch and is a special volunteer in London’s group. She is currently a genetic epidemiologist in the Behavioral Health Epidemiology group at RTI International. [Laura Loehr, M.D., Ph.D.](#), was also an Epidemiology Branch postdoctoral fellow when she started working on the project and is now a research assistant professor at the UNC Gillings School of Global Public Health in Chapel Hill, N.C.

Stokes presents at international conference on animal models and drug testing

By NICEATM

Rear Adm. William Stokes, D.V.M., director of the National Toxicology Program (NTP) Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM), traveled to New York to speak on “Best Practices for the Use of Animals in Toxicological Research and Testing.” Stokes addressed attendees at a conference on “[Animal Models and Their Value in Predicting Drug Efficacy and Toxicity](#)” Sept. 15-16 at the New York Academy of Sciences (NYAS).

The goals of the meeting were to provide participants an opportunity to examine the traditional role of animal models in drug discovery, the strengths and weaknesses of the animal models, and ways in which to reduce, refine, and replace animal models in biomedical research. The conference was organized by [The Global Medical Excellence Cluster \(GMEC\)](#) and NYAS, in collaboration with [Imperial College London](#) and [King’s College London](#). NIEHS, the National Center for Research Resources, and the National Institute of Diabetes and Digestive and Kidney Diseases provided support for the conference.



*NICEATM Director William Stokes
(Photo courtesy William Stokes)*

Responsible use of animals as models of human disease and injury

Laboratory animals are used as models of human disease and injury in the development of new medicines and vaccines. However, disease or toxic injury can often result in significant pain and distress, and such studies can involve large numbers of animals. Welfare concerns have led to national policies and laws in the United States and other countries to ensure the humane care and use of laboratory animals, and to require the consideration of ways to reduce, refine, by decreasing or eliminating pain and distress, and replace animal use before studies are approved.

Stokes’ address focused on advances in science and technology that have been applied to develop new testing methods and strategies that can reduce, refine, and in some cases replace animal use. Scientific advances are also helping to reduce uncertainties in extrapolating from animal models to humans. The continued development and appropriate use of scientifically sound testing methods are expected to further improve animal welfare and support improved health for people, animals, and the environment.

“A better understanding of disease and injury at the cellular and molecular levels is allowing us to identify earlier *in vivo* and *in vitro* markers of those diseases and injuries,” Stokes noted. “These biomarkers can lead to development of non-animal tests that will allow us to reduce or even replace animal use for some studies. They may also serve as the basis for earlier humane endpoints to avoid or reduce pain and distress in animal studies.”

Stokes, a laboratory animal veterinarian, has made animal welfare a focus of his career. He is a board-certified diplomate of the American College of Laboratory Animal Medicine and charter diplomate of the American College of Animal Welfare. He has been recognized by the American Veterinary Medical Association, the Society of Toxicology, the Humane Society of the United States, and other organizations for his contributions to laboratory animal medicine and enhancement of animal welfare.

A comprehensive open access multimedia conference report will be made available on the NYAS website later this year (www.nyas.org).

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NICEATM convenes international workshop on rabies vaccine testing

By NICEATM

NIEHS scientists Rear Adm. William Stokes, D.V.M., and Warren Casey, Ph.D., joined other scientists from around the world Oct. 11-13 at the “International Workshop on Alternative Methods for Human and Veterinary Rabies Vaccine Testing: State of the Science and Planning the Way Forward.” More than 70 scientists from 14 different countries, representing government, industry, and academia, attended the workshop.

Workshop participants reviewed new testing methods that may provide improved accuracy and efficiency, and developed recommendations to validate and implement their use. The new methods are also expected to further reduce, refine, by lessening or eliminating pain and distress, and eventually replace the use of animals for potency testing of human and veterinary rabies vaccines.

Combating a major public health problem

Rabies is a deadly disease that kills more than 70,000 people worldwide each year, and rabies vaccines are the most important resources available for prevention of rabies infections. In the U.S. and other developed countries, widespread use of veterinary rabies vaccines protects pets and wildlife from disease. This practice significantly reduces the risk to humans in these countries from exposure to infected wildlife and domestic animals. For those estimated 15 million people each year exposed to the rabies virus, post-exposure human rabies vaccination prevents disease and saves lives.

The current methods used to evaluate the effectiveness of each production lot of veterinary and human rabies vaccine involves vaccinating animals and then challenging them with the live rabies virus. This approach requires large numbers of laboratory animals and causes significant animal pain and distress. A [workshop](#) organized last year by the [NTP Interagency Center for the Evaluation of Alternative Toxicological Methods \(NICEATM\)](#) and the [Interagency Coordinating Committee on the Validation of Alternative Methods \(ICCVAM\)](#) identified rabies vaccines as one of the highest priorities for research, development, and validation of alternative test methods for potency and safety testing.

New approaches for testing vaccines

“Promising new approaches to rabies vaccine testing are now available that are more humane and use fewer or no animals. The technology exists to put those approaches into practice now or in the near future,” explained Stokes, who is director



Stokes introduced breakout group co-moderators as they reported on findings of breakout session 1: Antibody Quantification (Serologic) Methods for Rabies Vaccine Potency Testing: Validation Status, Data Gaps, and Implementation Strategies. (Photo courtesy of NICEATM)

Biologics Working Group

NICEATM and the ICCVAM interagency Biologics Working Group (BWG) were primarily responsible for organizing the workshop. The BWG is co-chaired by Jodie Kulpa-Eddy, D.V.M., of the USDA, and Richard McFarland, M.D., Ph.D., of the U.S. Food and Drug Administration (FDA). Kulpa-Eddy is also currently chair of ICCVAM and the USDA’s principal ICCVAM representative. In addition to the FDA and USDA, the BWG includes scientists from the Centers for Disease Control and Prevention, U.S Department of Defense, U.S. Department of the Interior, NIEHS, and the National Institute of Allergy and Infectious Diseases. Stokes and Casey are the NIEHS representatives on the BWG.

of NICEATM. “These approaches are more humane, faster, cheaper, and more accurate. They’re also safer for laboratory workers, as they don’t require handling of live rabies virus.”

The goals of last month’s workshop were to review the current state of the science of these methods, and to define efforts necessary to achieve global acceptance and implementation. The workshop was organized by NICEATM and ICCVAM, in partnership with the European Centre for the Validation of Alternative Methods, the Japanese Center for the Validation of Alternative Methods, and Health Canada. The workshop was hosted by the U.S. Department of Agriculture (USDA) Center for Veterinary Biologics at the recently established National Centers for Animal Health in Ames, Iowa. Having the workshop at this state-of-the-art research facility encouraged participation by scientists from USDA and the numerous vaccine manufacturers in the Midwest. The workshop was co-sponsored by the International Alliance for Biological Standardization.

Workshop participants reviewed a recent international study on a method that measures protective antibodies from vaccinated animals, to assess rabies vaccine potency. This method eliminates the need for challenge testing with live virus, thereby avoiding severe pain and distress to the test animals and providing for improved worker safety. An action plan was formulated to achieve global implementation of this alternative method. Workshop participants also reviewed the state of the science for methods that measure the specific protective protein in vaccines, as a way to evaluate potency without animal testing. Finally, workshop participants recommended steps that can be taken immediately to relieve animal pain and distress, including routine use of anesthetics and analgesics, and ways to reduce the number of animals required in the current potency test.

Presentations and a summary of recommendations from the workshop are available on the [NICEATM-ICCVAM website](#). A workshop report will be published early next year in the journal *Biologicals*.



Lukas Bruckner, D.V.M., Institute of Virology and Immunoprophylaxis (IVI), Switzerland, led discussions on breakout session 2: In Vitro Antigen Quantification Methods for Rabies Vaccine Potency Testing: Validation Status, Data Gaps, and Implementation Strategies. (Photo courtesy of NICEATM)



Workshop attendees included international regulatory agencies, industry representatives, and the staff from the USDA Center for Veterinary Biologics as well as NICEATM staff and ICCVAM agency representatives. (Photo courtesy of NICEATM)

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New toxicology lab is joint effort of NCI and NIEHS

By Ian Thomas

In an announcement to Institute leadership Oct. 19, NIEHS/NTP Director [Linda Birnbaum, Ph.D.](#), unveiled her plans for the Laboratory of Toxicology and Toxicokinetics (LTT), a joint research endeavor of the [National Cancer Institute \(NCI\)](#) and the NIEHS Division of Intramural Research. Administered by NCI and operated out of the NIEHS main campus in Research Triangle Park, N.C., this newest addition to the NIH research family will focus predominantly on toxicity of xenobiotics — chemicals that are foreign to a living organism, such as a drug, pesticide, or carcinogen — with an emphasis on environmental pollutants.

“We’re extremely excited for the future of this lab,” said Birnbaum of the project, which she herself will spearhead. “We’ve assembled a wonderful staff of talented scientists, each of whom brings a highly unique set of skills to the team and all of whom are eager to get started.”

All in the family

Boasting a small staff of 4-6 members, LTT will be led by [Mike Sanders, Ph.D.](#), a former researcher with NTP and a longtime colleague of Birnbaum.

“I’ve known Linda since 1981, when we worked together in the Chemical Disposition and Metabolism Group here at NIEHS,” recalled Sanders, a career toxicologist who earned his doctorate from North Carolina State University. “In many respects, much of the work we’ll be doing here is a carryover from those early days.”

According to Sanders, LTT’s initial focus will be the further examination of brominated flame retardants, chemicals used in many flame resistant materials that have come under scrutiny in recent years for their potentially harmful effects to the environment and human health. While this is presently a hot button issue within the scientific community, Sanders notes that it’s of particular importance to Birnbaum.

“Linda is extremely passionate about protecting human health, especially with regard to the toxic effects of chemicals on the environment,” said Sanders. “That makes both this lab and its mission very near and dear to her because, in many ways, they’re an extension of the work she’s done throughout her career as a scientist.”

Back to the future

Sanders admits that while the manners and methodologies of scientific research have evolved significantly since the early 1980s, both he and Birnbaum agree that LTT will always remember where it came from.



After giving leadership her undivided attention for nearly three years, Birnbaum is ready to spend some time on her own research with flame retardant chemicals. (Photo courtesy of Steve McCaw)



Like Birnbaum, Sanders holds a Diplomate of the American Board of Toxicology (D.A.B.T.) certification. (Photo courtesy of Steve McCaw)

“As it pertains to characterizing mechanisms of toxicity, this lab will employ some newer, cutting-edge technologies, which are designed to investigate chemical effects at the molecular level,” Sanders explained. “Still, when it comes to chemical metabolism and disposition, we’ll always have room for the tried and true techniques that we used in the old NIEHS group in 1981.”

Help from the masses

Sanders says that LTT will soon be up and running with the first of its experiments, an impressive achievement given its otherwise empty-shell status upon his arrival in mid-July.

“Anytime you’re trying to get a program like this off the ground, there are always administrative and logistical hoops to jump through,” he noted. “Since the start of this process this past summer, we’ve built this entire lab completely from scratch and that simply could not have been done without the incredible hard work of everyone involved from both NCI and NIEHS.”

For more information about LTT, or to schedule a tour, contact Mike Sanders at 919-541-1872 or by email at sander10@niehs.nih.gov.

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

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NIH announces funding opportunity for transformative research

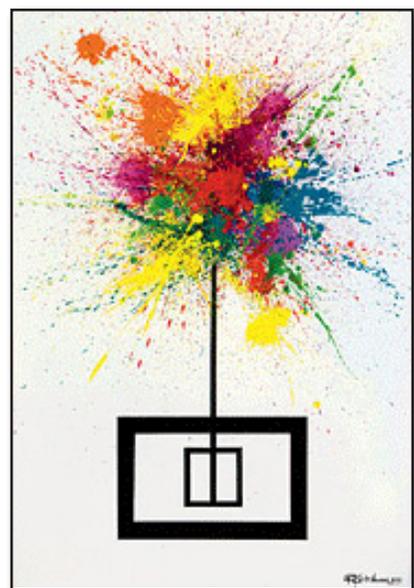
NIH will accept applications for 2012 NIH Director’s Transformative Research Awards through Jan. 12, 2012, with letters of intent due Dec. 12, 2011. The program is funded through the NIH Common Fund.

Highlights of the awards include the following:

- Exceptionally innovative, high risk, original and/or unconventional research
- Basic, clinical, or behavioral studies
- The NIH Common Fund intends to commit \$25 million dollars in FY 2012 for this initiative
- Up to one-third of the budget will be reserved for project exceeding \$1 million in direct costs per year.

Applicants should read the instructions in RFA-RM-11-006 at <http://grants.nih.gov/grants/guide/rfa-files/RFA-RM-11-006.html>. Additional information, including Frequently Asked Questions about the Transformative Research Award initiative is available at <http://commonfund.nih.gov/TRA>.

Additional questions about the Transformative Research Award initiative or application process should be directed to Transformative_Awards@mail.nih.gov.



The Transformation Research Awards icon reflects the divergent thinking the program hopes to foster in the field of biomedical research. (Photo courtesy of NIH)

The NIH Common Fund encourages collaboration and supports a series of exceptionally high impact, trans-NIH programs, and is managed by the NIH Office of the Director, in partnership with the various NIH Institutes, Centers, and Offices. Additional information about the NIH Common Fund can be found at <http://commonfund.nih.gov>.

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This month in EHP

By Ian Thomas

With the U.S. Department of the Interior Office of Surface Mining Reclamation and Enforcement reviewing options to improve environmental oversight of surface mining operations, the November issue of [Environmental Health Perspectives \(EHP\)](#) offers a timely examination of the controversy surrounding potential health impacts of mountaintop removal (MTR) coal mining. New research is beginning to link MTR mining and adverse outcomes in community health, raising questions about whether the potential health costs of MTR mining outweigh its benefits.

A second story, titled “Are We on the Same Page? Action Agenda of the National Conversation on Public Health and Chemical Exposures,” examines the National Conversation’s recommendations for preventing exposure to hazardous chemicals.

In this month’s [Researcher’s Perspective](#) podcast, host Ashley Ahearn speaks with NIEHS grantee [David Savitz, Ph.D.](#), of Brown University, regarding the epidemiologic evidence about cell phone use and human health effects.

Featured commentary, reviews, and research this month include the following:

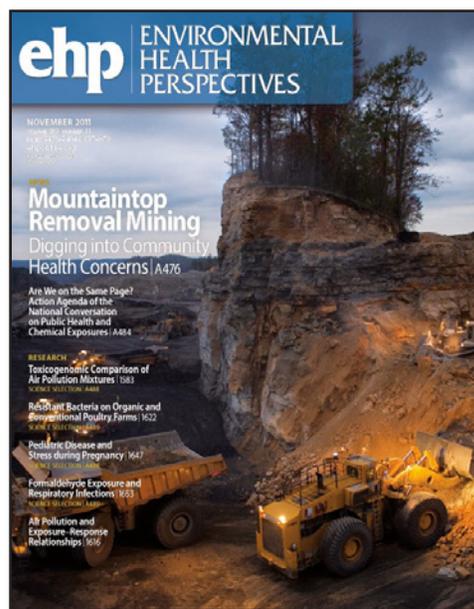
- Toxicogenomic Comparison of Air Pollution Mixtures
- Resistant Bacteria on Organic and Conventional Poultry Farms
- Pediatric Disease and Stress During Pregnancy
- Formaldehyde Exposure and Respiratory Infections
- Air Pollution and Exposure-Response Relationships

(Ian Thomas is a public affairs specialist in the NIEHS Office of Communications and Public Liaison.)

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<http://twitter.com/ehponline>



Upcoming Falk lecturer Danny Reinberg

By Angelika Zaremba

Epigenetic biochemist Danny Reinberg, Ph.D., will present this year's annual Hans Falk Lecture Nov. 29 at NIEHS. Hosted by NIEHS deputy director Rick Woychik, Ph.D., Reinberg will provide insights into epigenetics research with his talk on "Molecular Mechanisms of Epigenetic Inheritance."

[Reinberg](#) is a professor in the Department of Biochemistry at the New York University (NYU) School of Medicine. After completing his B.S. in Chile, he completed a doctorate in molecular biology at the Albert Einstein College of Medicine in New York. In 1986, he became an independent investigator at the University of Medicine and Dentistry of New Jersey. In 2006, Reinberg received an appointment as a [Howard Hughes Medical Institute investigator](#). That same year, he moved to NYU to continue pursuing his passion for exploring the biochemistry of gene expression.

Reinberg's team is focusing on the molecular mechanisms of epigenetics. This field of science is defined as the study of the extra-genetic information that gives rise to different patterns of gene expression that distinguish different cells and influence phenotype. The research team is using mice and ants as model systems to study epigenetic modifications. Reinberg hypothesizes that, like other multicellular organisms, similar mechanisms are at work at the organism level in ants to establish and maintain an individual identity for their respective roles in the colony and give rise to distinct cell identities.

Gene expression pattern regulation is also an important factor in different diseases, such as cancer, that may be caused, at least in part, by environmental factors. Woychik said of his guest, "Dr. Reinberg has been a leader in the field of studying the biochemistry associated with changes in chromatin structure that drive epigenetic regulation of the genome. With the increasing interest in understanding the influence of the environment on epigenetic regulation of gene expression, his research is highly relevant to the work at NIEHS."

Hans Falk, Ph.D., joined NIEHS in 1967 and made important contributions to the emerging field of environmental health science during his career as the Institute's first scientific director. Initiated by scientists and friends of Falk, the annual memorial lecture series features noted guest speakers who have made significant contributions to environmental health science research, among them several Nobel Prize winners.

(Angelika Zaremba, Ph.D., is a visiting postdoctoral fellow in the NIEHS Laboratory of Signal Transduction Inositol Signaling Group.)

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Reinberg, one of the leading scientists in the field of epigenetics, received the Faculty Research Award from the American Cancer Society. He holds a sculpture of an ant, an unusual, but informative, model for studying modifications in gene expression. (Photo courtesy of NYU).

Registration open for upcoming exposome workshop

By Eddy Ball

Registration is underway for a workshop on “[Emerging Technologies for Measuring Individual Exposomes](#)” Dec. 8-9 in Washington, D.C. The workshop is the latest in the National Academy of Sciences (NAS) ongoing series organized by the Standing Committee on Use of Emerging Science for Environmental Health Decisions sponsored by NIEHS.

The event is free and open to the public, but [registration](#) is required for those planning to attend in person. Instructions on how to access the webcast will be available approximately one month prior to the workshop.

This workshop will take a close look at emerging technologies that can be used to gather individual exposure information, based upon external and internal measurements. Presentations and discussions will explore which of the technologies are ready now and which are still emerging for use in environmental health research.

Particular attention will be paid to the relative advantages and disadvantages of external and internal measurements for characterizing individual exposomes and for performing environment-wide association studies. Recent proof-of-concept studies will be highlighted and bioinformatic tools will be discussed. This synthesis should inform researchers and policy makers about the critical roles that the exposome concept and new technologies can play in understanding the origins of human diseases.

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Extramural papers of the month

By Nancy Lamontagne and Rebecca Wilson

- [Smart management could mitigate risk of arsenic poisoning from wells](#)
- [Mutational signature for aristolochic acid](#)
- [Mechanism for green tea’s health benefit](#)
- [Lead exposure and child development](#)



Read the current Superfund Research Program [Research Brief](#). New issues are published on the first Wednesday of each month.

Smart management could mitigate risk of arsenic poisoning from wells

A study from NIEHS Superfund Research Program-funded scientists shows that Bangladeshi citizens at risk of arsenic poisoning from their drinking water may be able to avoid illness by carefully managing deep-water wells. This research addresses a concern that pumping uncontaminated deep groundwater could lead to the intrusion of contaminated water from a shallower aquifer above.

The researchers injected arsenic-rich water into a deep aquifer in Bangladesh and monitored the change in concentration. They found that arsenic concentration had fallen by 70 percent after one day and continued to decline over the monitoring period. The decline was attributed to arsenic attaching to sediments in the deep aquifer.

The field results were applied to a hydrological model of the Bengal Basin. Water demand for household use was compared with demand for household use and irrigation water combined. They found that the risk of contamination increases significantly with increased demand.

The results from the study also illustrate how water demand influences groundwater vulnerability. Significantly increasing water demand, such as for irrigation purposes, means that the water that remains in the ground is more likely to become contaminated.

Citation: Radloff KA, Zheng Y, Michael HA, Stute M, Bostick BC, Mihajlov I, Bounds M, Huq MR, Choudhury I, Rahman MW, Schlosser P, Ahmed KM, van Geen A. 2011. Arsenic migration to deep groundwater in Bangladesh influenced by adsorption and water demand. *Nat Geosci*; doi:10.1038/ngeo1283 [Online 9 October 2011]. [Story](#)

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Mutational signature for aristolochic acid

NIEHS-supported researchers have identified the mutational signature for the environmental carcinogen aristolochic acid. This distinct mutational signature could be used as a biomarker to detect whether a person had prior exposure to aristolochic acid.

There is evidence that aristolochic acid causes endemic (Balkan) nephropathy, a chronic renal disease that affects residents of rural villages near tributaries of the Danube River. The disease is associated with upper urinary tract cancer. Aristolochic acid is found in *Aristolochia* herbs, which grow in fields cultivated for wheat in the Danube River basin. The herbs likely mix with the harvested wheat used to make bread.

The researchers analyzed tumor tissue from residents of areas where endemic nephropathy has been prevalent. Of the 97 tumors analyzed, 42 showed mutations in the tumor suppressor gene *TP53*, and the researchers identified a pattern of mutations unique to this group.

According to the study, the aristolochic acid mutational signature could be used to elucidate a suspected link between botanical products containing aristolochic acid and a high prevalence of upper urinary tract cancer and chronic renal disease in countries where *Aristolochia* herbal remedies have been used. For example, a third of the people in Taiwan have been prescribed Chinese herbal products known or suspected to contain aristolochic acid.

Citation: Moriya M, Slade N, Brdar B, Medverec Z, Tomic K, Jelaković B, Wu L, Truong S, Fernandes A, Grollman AP. 2011. TP53 Mutational signature for aristolochic acid: an environmental carcinogen. *Int J Cancer* 129(6):1532-1536. [Story](#)

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Mechanism for green tea's health benefit

Researchers supported by NIEHS have shown that a component of green tea boosts the numbers of regulatory T cells, which are important for immune function and for suppressing autoimmune diseases.

Mice treated with epigallocatechin-3-gallate (EGCG), the major polyphenol in green tea, showed significantly increased numbers and frequencies of regulatory T cells in the spleen and lymph nodes and improved control of

their immune response. Although the polyphenol didn't work as well as prescription drugs, the ability of dietary agents, such as EGCG, to target similar mechanisms, may allow for sustained and longer-term use with lower toxicity than prescription drugs.

Mice treated with epigallocatechin-3-gallate, the major polyphenol in green tea, showed significantly increased numbers and frequencies of regulatory T cells in the spleen and lymph nodes and improved control of their immune response. Although the polyphenol didn't work as well as prescription drugs, there are few concerns about its long-term use or toxicity.

The study also revealed that the polyphenol likely acts in part through an epigenetic mechanism. Although more research is needed to fully understand the mechanisms at work, the study provides a foundation for evaluating various dietary strategies for modulating immune function. The researchers say that dietary substances such as green tea could one day provide an easy and safe way to help control autoimmune problems and address various diseases.

Citation: [Wong CP](#), [Nguyen LP](#), [Noh SK](#), [Bray TM](#), [Bruno RS](#), [Ho E](#). 2011. Induction of regulatory T cells by green tea polyphenol EGCG. *Immunol Lett* 139(1-2):7-13.

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Lead exposure and child development

NIEHS grantees looking for gene-environment interactions that might modify the effect of lead exposure on cognitive development found that for the group of Mexican children they studied there was no evidence that polymorphisms in two dopamine neurotransmission genes alter the effect of lead exposure.

The researchers studied polymorphisms in the dopamine transporter (DAT1) and dopamine receptor D2 (DRD2) genes, because dopamine neurotransmission is thought to play a role in the cognitive problems associated with lead exposure.

Independent of postnatal lead exposure, the researchers found that prenatal lead exposure was adversely associated with development in children 24 months old, but this association was not apparent at 48 months. Children with a polymorphism in the DRD2 Taq1A gene scored higher on the Mental Development Index and the McCarthy memory scale. DRD2 regulates neurotransmission, and the Taq1A polymorphism is linked with a reduction in dopamine receptor-2 density and availability.

For the population studied, neither DAT1 nor DRD2 polymorphisms brought about gene-environmental interactions that modified the effects of prenatal or postnatal lead exposure on early childhood development. The study concluded that more studies are needed because of differing results found for other populations.

Citation: [Kordas K](#), [Ettinger AS](#), [Bellinger DC](#), [Schnaas L](#), [Téllez Rojo MM](#), [Hernández-Avila M](#), [Hu H](#), [Wright RO](#). 2011. A Dopamine Receptor (DRD2) but Not Dopamine Transporter (DAT1) Gene Polymorphism is Associated with Neurocognitive Development of Mexican Preschool Children with Lead Exposure. *J Pediatr* 159 (4):638-643.

(Nancy Lamontagne is a science writer and Rebecca Wilson is an environmental health information specialist with MDB, Inc., a contractor for the NIEHS Division of Extramural Research and Training, Superfund Research Program, and Worker Education and Training Program.)

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Intramural papers of the month

By Raluca Dumitru, Brant Hamel, Sonika Patial, and Sheetal Thakur

- Two point mutations may influence the efficacy of breast cancer treatment
- IL-35 production by regulatory T cells reverses allergic asthma
- New rank-based methodology useful for large-scale association studies
- Heat-Shock Protein 70 is an important regulator of O₃-induced lung inflammation

Two point mutations may influence the efficacy of breast cancer treatment

A new study by NIEHS researchers reveals that mutating two amino acids, L543 and L544, in the helix 12 of the AF-2 region of estrogen receptor alpha (ERalpha) reduces estradiol-induced gene transcription and also converts selective ER modulators (SERMs) such as Tamoxifen (TAM) or the ER antagonist ICI182780 (ICI) from antagonists into agonists. The findings in an innovative knock-in mouse model and *in vitro* data offer new insights into the tissue-selective functions of SERMs, drugs which are widely used to prevent and treat breast cancer by interfering with the activity of estrogen. Significantly, the paper is the first report showing that estrogen does not activate the function of AF-1 independent of AF-2 and that certain tissues have a preference for AF-1 versus AF-2 activities.

ERalpha belongs to the nuclear receptor subfamily of ligand-inducible transcription factors. This ligand-induced transcription of ERalpha involves the action of two distinct activation functions, AF-1 and AF-2, which are located in the N-terminal and C-terminal regions, respectively. AF-1 and AF-2 can act interdependently or in concert with each other, as suggested by previous *in vitro* cell studies.

The researchers demonstrated that a functional AF-2 is absolutely critical for regulating some female reproductive-tissue hormone responses, but other tissues utilize the AF-1 functionality. Along with their mouse experiments, researchers used *in vitro* assays to show that ICI activates AF-2 mutated ER α predominantly through the AF-1 region in different tumor tissue cell types.

Citation: Arao Y, Hamilton KJ, Ray MK, Scott G, Mishina Y, Korach KS. 2011. Estrogen receptor alpha AF-2 mutation results in antagonist reversal and reveals tissue selective function of estrogen receptor modulators. Proc Natl Acad Sci USA 108(36):14986-14991.

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IL-35 production by regulatory T cells reverses allergic asthma

A new study from investigators at NIEHS implicates a recently discovered cytokine, IL-35, as critical for regulating allergic responses in the airway. IL-35 was found to be produced specifically in inducible costimulator (ICOS)-positive regulatory T cells and to prevent airway hyperresponsiveness (AHR), a key clinical symptom of allergic asthma. This work suggests that targeting the IL-35 pathway may benefit patients who suffer from AHR.

The researchers found that in allergen-sensitized mice, a single subsequent allergen initially caused AHR, but that repeated exposures quickly led to down-regulation of that response. Building upon previous work in the lab, decreasing levels of IL-17 were shown to contribute to the loss of AHR. The authors went on to demonstrate that rising numbers of ICOS+ T_{reg} cells led to a decrease in IL-17 levels through a mechanism dependent on the presence of ICOS and its ligand, B7h, as well as the production of IL-35 by these cells. This study suggests that pharmacological mechanisms that boost IL-35 production may prove beneficial in the treatment of allergic asthma by decreasing IL-17 levels and AHR.

Citation: [Whitehead GS](#), [Wilson RH](#), [Nakano K](#), [Burch LH](#), [Nakano H](#), [Cook DN](#). 2011. IL-35 production by inducible costimulator (ICOS)-positive regulatory T cells reverses established IL-17-dependent allergic airways disease. *J Allergy Clin Immunol*; doi:10.1016/j.jaci.2011.08.009 [Online 7 September 2011].

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New rank-based methodology useful for large-scale association studies

NIEHS biostatisticians have developed a novel approach that can be used for allotting the proper sample size in genomic association studies and for determining the number of initial results to follow up on after completion of a study. The approach is based on the evaluation of probability that genuine discoveries will have a specific rank in a list of results sorted by their P-values. This rank-based approach is well suited for studies with different marker densities and linkage disequilibrium patterns and applicable any time a large number of statistical tests are conducted simultaneously.

The researchers wanted a way to analyze top hits, selected from the large number of susceptibility gene variants generated by a study. The rank-based process that they developed for that purpose utilizes a mathematical model to ensure accurate selection of top hits based on controlling the proportion of genuine discoveries among them.

In conjunction with the development of their rank-based analysis, the authors developed software that allows scientists to estimate ranking probabilities and the number of top hits that would contain true associations with a specified probability. The software allows researchers to plan discovery and replication stages in large-scale genomic studies.

Citation: [Kuo CL](#), [Zaykin DV](#). 2011. Novel rank-based approaches for discovery and replication in genome-wide association studies. *Genetics* 189(1):329-340.

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Heat-Shock Protein 70 is an important regulator of O₃-induced lung inflammation

A new collaborative study between researchers from NIEHS, Michigan State University, and Johns Hopkins University has identified heat shock proteins that act as effector molecules in response to ozone (O₃)-induced toll-like receptor 4 (Tlr4) signaling. This group found Tlr4 to be involved in O₃-induced pulmonary inflammation, but the downstream signaling events were unknown until the research team determined the mechanism.

Tlr4 protein is activated by the binding of ligands, which leads to the recruitment of adaptor molecules such as MyD88. Tlr4 mutant and Tlr4 normal mice were exposed to O₃ and to filtered air as a control. In response to O₃, Tlr4 signaling significantly upregulated MyD88-dependent and independent pathways in Tlr4 normal mice, but not Tlr4 mutant mice, suggesting that both effector pathways were involved in mediating O₃-induced inflammation and hyperpermeability.

Microarray analysis further identified heat-shock proteins as one of the groups of proteins significantly upregulated in Tlr4 normal mice relative to Tlr4 mutants. Hsp70 knockout mice displayed a lower degree of inflammation and hyperpermeability compared with wild-type mice, thus validating the importance of Hsp70 in response to O₃.

The results of this study demonstrate that heat shock proteins are effectors in response to O₃-induced TLR4 signaling and these novel findings may have therapeutic and preventive implications for inflammatory diseases resulting from environmental exposures.

Citation: [Bauer AK](#), [Rondini EA](#), [Hummel KA](#), [Degraff LM](#), [Walker C](#), [Jedlicka AE](#), [Kleeberger SR](#). 2011. Identification of candidate genes downstream of TLR4 signaling after ozone exposure in mice: a role for heat shock protein 70. *Environ Health Perspect* 119(8):1091-1097.

(Raluca Dumitru, M.D., Ph.D., is an Intramural Research Training Award fellow in the NIEHS Stem Cell Biology Group of the Laboratory of Molecular Carcinogenesis. Brant Hamel Ph.D., is an Intramural Research Training Award fellow in the NIEHS Molecular Endocrinology Group of the Laboratory of Signal Transduction. Sonika Patial, Ph.D., is a visiting fellow in the NIEHS Laboratory of Signal Transduction. Sheetal Thakur, Ph.D., is a visiting fellow in the NIEHS NTP Toxicology Branch.)

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Inside the Institute

CFC charity fair and bake sale kick off 2011 campaign

By Eddy Ball

The 2011 NIEHS Combined Federal Campaign (CFC) officially opened the 2 ½-month long fundraiser with a charity fair and bake sale Oct. 4 in the main building at NIEHS. By the final week of October, pledges were right on track, approaching half the \$105,000 goal.

The campaign received enthusiastic support from leadership, with regular messages from NIEHS/NTP Director Linda Birnbaum, Ph.D., thanking employees for their generosity and encouraging pledges from procrastinators. “The [online system](#) and payroll deduction make it easy and painless to donate,” she wrote in one message. “Of course, the CFC will gladly take cash or a check, too!”

A broad network of CFC volunteers followed up the campaign kick-off by selling raffle tickets for an iPad2 to be given away Nov. 18 and a three-day book, music, and video sale Oct. 25-27. The prices were right, as low as 50 cents for books on the final day, with a selection sure to appeal to almost any literary preference, from lurid thrillers and steamy romances to bloody final scenes of Shakespearean tragedies and the sensuous introspection of Marcel Proust.

With weather seemingly ordered for the occasion, the more athletic at NIEHS joined the annual CFC 5K run and 2-mile walk, for good-natured competition and fun with EPA employees. Blue skies, trees beginning to change color, and cool temperatures drew crowds to exercise, socialize, and, of course, make pledges.

With the month coming quickly to an end, CFC began a silent auction Oct. 26 of donated arts, crafts, stays at hotels, a weekend beach vacation, and tickets to entertainment. Volunteers held an ice cream social and costume contest Oct. 27 in the Keystone Building and Oct. 31 on the main campus, before entering the final stretch of the campaign, which comes to an end Dec. 15.



A popular stop for NIEHS employees and contractors passing through the halls was the baked goods table worked by CFC volunteers Judy Hanson, left, and Eli Ney. It featured cakes, cookies, and pies for sweet lovers and specialty pretzels for those who prefer salty treats. (Photo courtesy of Steve McCaw)



CFC volunteer Rachel Frawley, left, spoke with Nora Casper of the Literacy Council of Wake County about adult reading programs. (Photo courtesy of Steve McCaw)

The final event will be November 18, when the final auction bids can be made, winners chosen, and the iPad2 raffle winner will be announced. Join your fellow employees to see the winners and enjoy another bake sale.

Remember, you can still use the online system or the paper pledge forms. Details about the remaining events and CFC division representatives are posted on the NIEHS CFC website.



Not surprisingly, NIEHS veterinarian Terry Blankenship-Paris, right, found her way to Animal Rescue, where representatives were eager to talk about their program. (Photo courtesy of Steve McCaw)



CFC co-chair Cindy Innes, center right, pointed to auction items at the 5K run and 2-mile walk table outside the main building at NIEHS. (Photo courtesy of Ron Cannon)



Birnbaum was on hand with her megaphone to work up enthusiasm, as the crowd gathered for the two-mile walk. (Photo courtesy of Ron Cannon)



With a starting call from Birnbaum, the 5K race was on. (Photo courtesy of Ron Cannon)

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Seminar highlights accommodations for the visually impaired

By Ian Thomas

For Ian Thomas and Sharon Giovinazzo being legally blind never meant being less than fully productive — or sacrificing their sense of humor about coping with the sighted world.

Thomas, an NIEHS public affairs specialist, and Giovinazzo, an executive with the [Raleigh Lions Clinic for the Blind \(RLCB\)](#), treated Institute employees to an informal discussion about how technology has helped open doors for them in the workplace, during a seminar they called “Donuts and Disabilities” Oct. 11 at NIEHS. With its unexpected blend of levity and gravitas, the seminar’s title helped set the tone for an entertaining and edifying look at how the world of work looks to people who lack the sight necessary for a driver’s license or the ability to match the color of their socks without the help of a smartphone app.

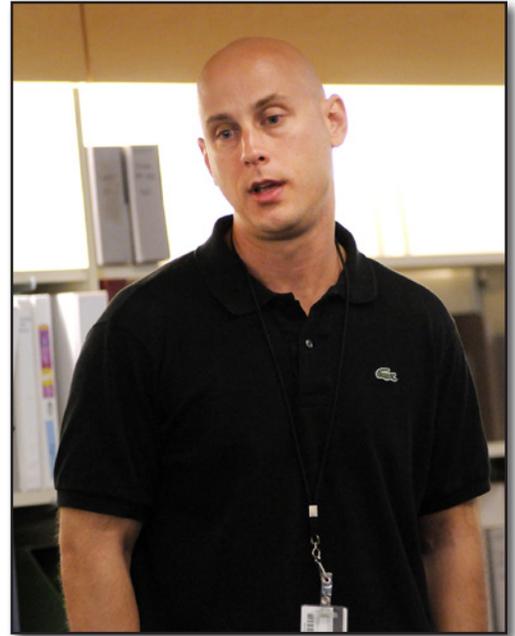
The seminar was sponsored by the NIEHS Disability Advocacy Committee (DAC) in recognition of [National Disability Employment Awareness Month](#), which was proclaimed by President Barack Obama Oct. 3.

Reading and writing with the help of technology

Thomas, an eight-year veteran of the radio industry, joined NIEHS in June, after having worked with several organizations, including Clear Channel Radio, EA Sports, the Charlotte Motor Speedway, and the U.S. Army. He has been legally blind since childhood, as a result of retinitis pigmentosa, an inherited disease that damages the light-sensitive rods and cones located in the back part of the eyes.

With the help of assistive technology that magnifies text and images, Thomas relies on peripheral vision as he performs essential parts of his job, such as reading, negotiating the internet, and writing. He talked enthusiastically about 21st century technology, which enables him to satisfy the requirements of his job, even as he goes about completing his work a little differently than do his sighted co-workers.

For Thomas, being able to communicate how he can do the job despite his visual impairment was what has made him successful in job interviews. “It’s a 50-50 process, a two-way street,” he said. “When a prospective employer asks how you can do something [even without complete vision], having the answers is critical.”



Employers have a right and a need to ask questions about how a person with a disability can do a job, Thomas said, and applicants have a responsibility to be prepared with the answers. (Photo courtesy of Steve McCaw)



Giovinazzo also praised integrated smartphone apps, such as her bar code reader and color identifier that help her at work, at home, and at play. (Photo courtesy of Steve McCaw)

Advocating for the visually impaired

A former Army medic who lost her sight as a consequence of inflammation of the optic nerve due to multiple sclerosis, Giovinazzo is vice president of development and community relations with RLCB. An ISO 9001-certified strategic partner, RLCB provides employment for the visually impaired in the areas of textile operations, manufacturing assembly/pick-pack, and contact center needs. Speaking of her personal and professional goals, Giovinazzo said, “I’m working to eliminate blindness as a disability.”

Like Thomas, Giovinazzo emphasized the importance of letting people know about the abilities of people with sight impairment and how they can be productive through reasonable accommodation. “It’s all about communication,” she said.

Giovinazzo, who earned two masters degrees after losing her sight, relies heavily on her communication skills to do a job that requires extensive travel and networking with RLCB customers. She is constantly negotiating unfamiliar environments and promoting the quality of work performed by employees with visual impairments.



John Peterson, one of Thomas’ colleagues in the NIEHS Office of Communications and Public Liaison, right, and Bullock-Allen appear to ponder the speakers’ suggestions for making the fitness facility more accessible. (Photo courtesy of Steve McCaw)

Beyond the workplace: coping with disability at play

During the question and answer portion of the seminar, NIEHS Health and Fitness Program Manager Stephanie Bullock-Allen asked the speakers, “How can I make our fitness room more accessible?”

“Keep things in order,” Thomas answered. “Simple organization makes a world of difference.” He described his own confusion in weight training, trying to sort out misplaced plates. He also suggested placing dots on the flat panels of machines to help users find the right controls.

Giovinazzo pointed to new technology that allows recordings to be embedded into stickers, such as the ones in the RLCB manufacturing facility that can be played with a special pen, and recommended familiarizing fitness trainers with the importance of verbalizing instructions.



Shown, left to right, Thomas and Giovinazzo join their hosts, DAC co-chairs Tina Jones and Dick Sloane, following the seminar. (Photo courtesy of Steve McCaw)

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)

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BIG promotes wellness and community fellowship at annual fish fry

By Ian Thomas

The Research Triangle Chapter of Blacks In Government (BIG) welcomed members of NIEHS, the U.S. Environmental Protection Agency (EPA), the U.S. Citizenship and Immigration Services (USCIS), and several other government agencies to NIEHS Oct. 6 for an afternoon of sunshine, food, and fellowship at the annual BIG fish fry. Held in the NIEHS covered picnic area, this year's event drew well over a hundred attendees, all of whom were eager to support a worthy cause, socialize with colleagues, and sample some good, old-fashioned Southern home cooking.

“We try to do this every year, as a way to bring people together and teach them a little about Southern culture,” explained NIEHS biologist Annette Rice, past president of BIG.

Featured on the day's menu was a choice of fried trout or whiting, along with coleslaw, french fries, baked beans, hushpuppies, and a mouth-watering assortment of freshly prepared cakes. While Rice freely admits that everyone deserves the occasional dietary splurge, such as fried trout and chocolate cake, furthering the public's understanding of everyday wellness is among BIG's top priorities.

“One of our goals this year is to increase community awareness about BIG's health and wellness program,” Rice said, gesturing to a table of volunteers behind her. “For that reason, we've partnered with the [Environmental Polymorphisms Registry](#) who are here all day to collect blood donations and help educate people on a number of other programs and protocols, both with BIG and NIEHS.”

Established in 1975, [Blacks In Government](#) is a non-profit organization devoted to giving African Americans in public service the chance to organize and use their collective strength to confront workplace and community issues. BIG's goals are to promote equity in all aspects of American life, excellence in public service, and opportunity for all Americans.



For EPA member Antoinette Ward, right, the fish fry was also a family affair, as she enjoys her meal with her husband and son. (Photo courtesy of Steve McCaw)



Left to right, postdoctoral fellows Anshul Pandya, Ph.D., and Ramendra Saha, Ph.D., joined biologist Mitzie Walker and biomedical engineer C.J. Tucker for some extracurricular fellowship away from pipettes and beakers. (Photo courtesy of Steve McCaw)

“This is always a fantastic event,” said NIEHS Scientific Director Darryl Zeldin, M.D., who attended along with fellow NIEHS leadership members Rick Woychik, Ph.D., David Miller, Ph.D., Joellen Austin, and Chris Long. “Excellent food, great conversation, plus it’s a wonderful way to get people involved with many of the great programs we have here at the Institute, such as those in our Clinical Research Unit.”

(Ian Thomas is a public affairs specialist with the NIEHS Office of Communications and Public Liaison.)



Even NIEHS employees who spent their formative years north of the Mason-Dixon line have learned the joys of traditional Southern cuisine. Woychik, left, chats with Zeldin, as Miller, center, gets ready to join them. (Photo courtesy of Steve McCaw)



NIEHS Office of Management employees, left to right, included Liz McMillan, Long, and Austin, who was enjoying the BIG event for the first time. (Photo courtesy of Steve McCaw)



The Research Triangle Chapter of BIG fish fry team included employees from NIEHS, EPA, and USCIS. Volunteers shown, left to right, are Stanis Sims (USCIS), Jennie Foushee (NIEHS), Antoinette Ward (EPA), Sheila Withers (NIEHS), Terry Jones (USCIS), David Sanders (EPA), Kimberly Peterson (NIEHS), Margaret George (NIEHS), Veronica Godfrey Robinson (NIEHS), Mary Ivy (USCIS), Myra Westmoreland (NIEHS), and Rice. (Photo courtesy of Steve McCaw)

NIEHS marks accreditation visit with sunshine and barbecue

By Ian Thomas

The NIEHS Comparative Medicine Branch (CMB) hosted an afternoon of sunshine, socializing, and Carolina barbecue Oct. 18 as a celebration of the successful completion of the Institute's site visit by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International. CMB wanted to thank many others at the Institute for their hard work and dedication during the triennial accreditation evaluation.

"We've been doing this ever since I got here in 1972," said Julius Thigpen, Ph.D., an NIEHS microbiologist and head of the CMB Quality Assurance Laboratory.

Every three years, the NIEHS animal care and use program must undergo a rigorous reevaluation of its AAALAC accreditation, in order to ensure that the program's use of animals follows all regulations and guidelines, and maintains the highest standards possible. This process requires an extensive amount of time and effort by the CMB staff, the bulk of which takes place long before the two-day site visit, hence the need for a little well-deserved rest and relaxation once the process has concluded.

"The success of the AAALAC site visit relies on the day-to-day efforts of everyone involved with providing outstanding care and support to not only the research animals themselves, but also the investigators who rely so heavily on them for their research efforts," said Diane Forsythe, D.V.M., NIEHS animal program director and chief of the Comparative Medicine Branch. "We are incredibly grateful for all of the support we receive, year in and year out, from everyone here in the Division of Intramural Research, the Office of Management, and many others across NIEHS."

The AAALAC will announce its official decision regarding NIEHS's ongoing accreditation in the spring of 2012.

(Ian Thomas is a public affairs specialist for the NIEHS Office of Communications and Public Liaison)

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Thigpen, left, and Forsythe had much to celebrate after long hours spent readying the animal facility for its accreditation review. (Photo courtesy of Steve McCaw)



Despite the long lines, a sizable crowd turned out to enjoy traditional barbeque and sides. (Photo courtesy of Steve McCaw)



Not surprisingly, lead researchers, including NIEHS Scientific Director Darryl Zeldin, M.D., right, turned out to show their support and respect for the folks at CMB who make certification possible. (Photo courtesy of Steve McCaw)



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