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NIEHS Spotlight

Trio from NIEHS Receive NIH Awards

By Jerry Phelps

Three members of the NIEHS family received awards July 12 at the 2006 NIH Director's Awards Ceremony on the Bethesda Campus. The NIEHS recipients are Tom Kunkel, Director of the Environmental Biology Program, Connie Riley, Administrative Officer in the Office of the Scientific Director, and Bill Copeland, Senior Investigator in the Laboratory of Molecular Genetics.

Kunkel received an NIH Director's Award "in recognition of his contributions to understanding the mechanisms of DNA repair enzymes and their functions." The NIH Director's Award is intended to recognize "...superior performance or special efforts significantly beyond the regular duty requirements, and directly related to fulfilling the mission of the National Institutes of Health." Riley also received an NIH Director's Award "in recognition of her competence, initiative, and reliability guiding the Intramural Budgetary Planning Process."

Copeland received an NIH Mentoring Award. The NIH Mentoring Award supports and encourages mentoring activities and awards individuals who promote mentoring as a core value at NIH. Awardees are honored for their "significant leadership, skill, and ability in serving as a quality mentor to one or more individuals." Copeland's citation read, "In recognition of constructive efforts to encourage and train new scientists as friend, mentor, and fellow investigator."

Elias Zerhouni, NIH Director, attended the ceremony and presented awards to over 330 NIH staff and Commissioned Corps Officers. Congratulations to the NIEHS recipients.



*Tom Kunkel, Director Environmental Biology Program
(Photographs by Steve McCaw of Image Associates)*



Connie Riley, Office of the Scientific Director



Bill Copeland, Laboratory of Molecular Genetics

DeLauder Named American Council on Education Fellow at Duke – Former NIEHS Summers of Discovery Participant

By Jerry Phelps

Sandra DeLauder, Interim Chair of the Department of Chemistry at North Carolina Central University (NCCU), has been named an American Council on Education (ACE) Fellow. She will spend the 2006-2007 academic year at Duke University preparing for administrative leadership opportunities.

DeLauder participated in the NIEHS Summers of Discovery Program from 1999-2003. She worked in Sam Wilson's laboratory with Bill Beard and Rajendra Prasad focusing primarily on the steady-state kinetics of DNA base insertion catalyzed with beta-polymerase.

DeLauder received her Ph.D. in chemistry from Howard University in 1992. She was an Association of Engineering Education Postdoctoral Fellow and a Faculty Fellow at the Naval Research Laboratory in Washington, D.C. from 1993-1995. She joined the faculty at NCCU in 1996.



Sandra DeLauder, Ph.D., (photograph courtesy of NCCU)

The ACE was founded in 1918. The Council provides leadership for higher education issues and policy such as life-long learning programs, international initiatives, and racial and ethnic equity in education. The ACE Fellows Program is a leadership development opportunity for senior faculty and administrators in academic settings. It provides professional development through training and on-the-job experience, with a focus on skills for institutional change. The program started in 1965 and has trained more than 1,500 higher education leaders. More than 300 fellows have gone on to serve as chief executive officers of colleges or universities, and more than 1,100 have served as provosts, vice presidents, and deans.

DeLauder said "I thoroughly enjoyed and valued the opportunities extended to me at NIEHS through the Summers of Discovery Program. Drs. Wilson, Beard and Prasad were all very supportive, and I consider the research experience a valuable part of my career."

From Second Chair to the Bench: An Unusual Path in Becoming a Scientist

By Jerry Phelps

Dan Shaughnessy, a post-doctoral fellow in Jack Taylor's laboratory in the NIEHS Laboratory of Molecular Carcinogenesis, didn't grow up dreaming of scientific discoveries and endless hours toiling away at a lab bench. Instead, he applied his talents and energy to music and specifically, the violin. Shaughnessy attended the Eastman School of Music in Rochester, New York graduating with a bachelor of music degree in 1982. From there he obtained a master's degree at the University of Houston in 1984 where he played in a graduate student string quartet, did freelance gigs when he got the chance, and taught private music lessons.

In 1985, he moved to Raleigh to teach music at Ravenscroft School, while his wife Lisa joined the N.C. Symphony. Two years later, Shaughnessy also joined the symphony as second chair in the violin section, and the pair was soon touring. At the time, the Symphony, a major U.S. orchestra, had a mandate to play in all of the State's fifty counties every two years.

Shaughnessy said, "The constant traveling became a problem when we started a family." Child care became a major issue since he and Lisa had no local family members to fall back on. Shaughnessy began to think of career options that would allow him to be at home more. He thought of a career as a scientist. He enjoyed biology in high school, and also the one science class he had taken in college. He began to explore options for returning to school to pursue a Ph.D. After consulting with staff at the Department of Environmental Health at the University of North Carolina to determine the undergraduate prerequisite courses he would need, Shaughnessy enrolled and took classes in chemistry and biology at North Carolina State University in the summer. Later that year, he took an extended leave from the symphony to focus on his studies. At a crossroads, he made a critical decision to pursue science full time and resigned from the symphony. He applied and was accepted to the School of Public Health at the University of North Carolina. He received both the master's of public health and Ph.D. degrees in 2000 and 2002 respectively. Shaughnessy worked with David DeMarini at the EPA's Environmental Carcinogenesis Division while a graduate student. He joined Taylor's lab as a post-doctoral fellow in 2002.



Dan Shaughnessy (right) and Pinchas Zuckerman (left) at rehearsal with the N.C. Symphony in 1992.

Shaughnessy's area of research is the role of diet in cancer risk with special emphasis on mutagen exposure from fried meats, and possible interventions to block their deleterious effects. While in the Taylor lab, he conducted a small controlled feeding study in humans. Volunteers ate a very strict diet consisting of lots of fried meat alone or in combination with three putative mutagen inhibitors – chlorophyllin, cruciferous vegetables, and yogurt. He used the Ames assay to detect fried-meat related mutagenicity in urine and stool samples, and the Comet assay to detect DNA damage in blood lymphocytes and rectal pinch biopsies. The study showed that DNA damage went down significantly in subjects eating the inhibitors along with the fried meat. DNA damage increased when subjects ate meat fried at high temperature compared to meat fried at low temperature, although that trend was not statistically significant. A larger study is necessary to confirm these findings.

Shaughnessy is again at a turning point in his life. At the end of his post-doctoral fellowship and searching for a permanent job, he has taken a position in the NIEHS Division of Extramural Research and Training as a Health Science Administrator. He is transitioning into the new career and expects to be full-time in September. While no longer playing professionally, he still plays the violin "for fun," performing occasionally with the Durham Choral Society, the Carolina Ballet, and the Opera Company of North Carolina. He and Lisa have two children: Sarah aged 15 and Emma, 12. He is looking forward to his new position and will certainly bring a wide array of talents to his role as a science administrator in DERT.



Science Notebook

DDT Slows Neurodevelopment in Babies

By Jerry Phelps

A research study from the University of California Berkeley suggests that the pesticide dichlorodiphenyltrichloroethane, commonly known as DDT, may slow neurodevelopment in children. An NIEHS-supported research team led by Brenda Eskenazi tested 360 children in and around Salinas, Calif. whose mothers had been exposed to DDT while doing agricultural work. Their findings show a connection between DDT exposure and a decrease in a child's mental and physical abilities.

The majority of the mothers came from Mexico, where DDT use was not banned until 2000. The United States began to phase out DDT use in the early 1960s after it was linked to cancer and reproductive problems in birds. The EPA banned the pesticide in 1972.

The study measured DDT and its metabolites in the mothers' blood and analyzed psychomotor development and mental development in the children at six months, 12 months and two years of age. Eskenazi and her team found that for every tenfold increase in DDT levels among mothers, there was a drop of two to three points in the children's mental and physical scores.

In an article about the study in the Los Angeles Times, NIEHS epidemiologist Walter Rogan said the study's findings "suggest DDT has effects that no one even thought to test for back when it was in use." Although not involved in this study, Rogan has published several findings on the adverse health effects of DDT exposure in women and infants in Southeast Asia.

An abstract of the article in *Pediatrics* is available at the following link:

[Eskenazi B, Marks AR, Bradman A, Fenster L, Johnson C, Barr DB, Jewell NP.](#) In utero exposure to dichlorodiphenyltrichloroethane (DDT) and Dichlorodiphenyldichloro-ethylene (DDE) and neurodevelopment among young Mexican American children. *Pediatrics*. 2006 Jul;118(1):233-41.

DEPT Papers of the Month

By Jerry Phelps

More Evidence for Parkinson's Disease and Pesticide Link

A large epidemiologic study shows that individuals reporting regular exposure to pesticides had a 70 percent higher incidence of Parkinson's disease than those reporting no exposure. The study, funded by NIEHS and conducted by researchers at the Harvard School of Public Health, is the first large-scale prospective study to examine the possible links between chronic pesticide exposure and Parkinson's disease.

Previous studies suggested pesticide exposure as a risk factor for the dreaded neurological disorder. However, the results were inconclusive because of the relatively small numbers of participants. The current study included

more than 143,000 subjects; 7,800 reported exposure to pesticides. No increased risk for Parkinson's disease was found from other occupational hazards including exposure to other chemicals or solvents.

Research utilizing twins has established that genetics probably plays a minor role in Parkinson's disease and thus has made environmental exposures the focus of much interest. A compound known as MPTP, a by-product of the production of a heroin-like illicit drug and structurally similar to the herbicide paraquat, causes death of neurons in the substantia nigra, the part of the brain affected by Parkinson's disease. For that reason, pesticide and herbicide exposures are considered likely to cause or contribute to the development of Parkinson's disease.

Citation: [Ascherio A, Chen H, Weisskopf MG, O'reilly E, McCullough ML, Calle EE, Schwarzschild MA, Thun MJ.](#) Pesticide exposure and risk for Parkinson's disease. *Ann Neurol.* 2006 Jun 26; [Epub ahead of print]

DNA Damage in Fish as Biomarkers for Exposure and Effects of Organic Pollutants

Identification of DNA damage in the liver and gills of native fish can serve to detect exposure to, and effects from, pollutants found in the environment, according to research from the Pacific Northwest Research Institute, Woods Hole Oceanographic Institution, the University of Maryland and the National Institute of Standards and Technology. The findings also suggest that these biomarkers can be used to track progress in cleaning up environmental contamination.

Researchers analyzed fish from two sites in Washington State. They compared English sole from the Duwamish River, which flows through an industrialized section of Seattle, to the same species taken from Quartermaster Harbor, a relatively clean area in the Puget Sound. A section of the lower Duwamish River was listed as an EPA Superfund Site in 2001. Chemicals contaminating the river bed include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons, mercury and other metals, and phthalates used in making plastics.

The river fish had higher levels of "deleterious alterations" in DNA isolated from their livers and gills than the harbor fish. The river fish also had higher levels of gene expression for the enzyme cytochrome P4501A, which "signaled changes in the liver associated with the oxidation of organic xenobiotics." The researchers conclude that these and similar DNA lesions can be used to detect impacts of chemical contaminants on fish populations. And since innate DNA repair processes can reverse previous damage as long as additional insults don't occur, they may be useful in assessing the effectiveness of environmental remediation efforts.

Citation: [Malins DC, Anderson KM, Stegeman JJ, Jaruga P, Green VM, Gilman NK, Dizdaroglu M.](#) Biomarkers signal contaminant effects on the organs of English sole (*Parophrys vetulus*) from Puget Sound. *Environ Health Perspect.* 2006 Jun;114(6):823-9.

Allergy and Respiratory Infections in Infants – Effects of Tobacco Smoke, Mold, and Older Siblings

Exposure to environmental tobacco smoke increases an infant's risk of developing allergic rhinitis by almost three-fold, report NIEHS grantee Grace LeMasters and trainee Jocelyn Biagini in the June issue of *Pediatric Allergy and Immunology*. The epidemiologic study was conducted with a group of 633 infants less than one-year of age and is the first to show the relationship between exposure to tobacco smoke and allergy in this age

group. The researchers also found that exposure to mold in the home is associated with increased risk of upper respiratory infections but not allergy, which differs from previously reported research in older children and adults.

Other findings include a protective effect of having older siblings in the home. Infants with at least one older sibling were less likely to have allergic rhinitis, also known simply as hay fever, by their first birthdays. This finding supports the “hygiene hypothesis,” a theory that exposure to infectious agents early in life may decrease the risk for allergic diseases such as asthma later in life. Presumably by having older siblings, these infants were exposed to a wider variety of viruses and bacteria, causing their immune systems to develop in a way that decreases the risk of allergy.

About one-fifth of all American adults smoke cigarettes resulting in about 43 percent of children being exposed to home environmental tobacco smoke. Further research is necessary to confirm these results and to determine the components of cigarette smoke that cause the effects.

Citation: [Biagini JM, Lemasters GK, Ryan PH, Levin L, Reponen T, Bernstein DI, Villareal M, Khurana Hershey GK, Burkle J, Lockey J.](#) Environmental risk factors of rhinitis in early infancy. *Pediatr Allergy Immunol.* 2006 Jun;17(4):278-84.

Asthma in Elementary School Children is Associated with Proximity to Concentrated Animal Feeding Operations

Elementary school children may be at higher risk for developing asthma if their school is near a large-scale livestock farm known as a concentrated animal feeding operation (CAFO), according to research published in the June issue of *Chest*, the journal of the American College of Chest Physicians. Joel Kline, an NIEHS-supported scientist at the University of Iowa Environmental Health Sciences Research Center, studied children at two rural Iowa elementary schools. The study school was a half mile from a CAFO and the control school was more than 10 miles away from any large-scale agricultural facility. Almost 20 percent of children at the study school had a physician-diagnosis of asthma compared to about 7 percent of the control school kids. When Kline broadened the definition of asthma to include asthma-like symptoms or asthma medication use, there was still more than a two-fold difference in the asthma prevalence. The overall rate of physician diagnosed asthma in Iowa is 6.7 percent.

CAFOs are controversial because of recurring problems with odor, ground and surface water contamination, and noise. According to Kline, they emit irritants and inflammatory substances that affect the health of workers at the facilities and are a detriment to air quality in surrounding communities. Prompted by these findings, he designed the current study to investigate whether there was a connection between CAFOs and increased rates of asthma among children in rural areas.

The paper urges caution on the interpretation of the results. Possible confounders of the study could be differences in smoking rates among the children’s parents, pet ownership, residence on a farm, asthma diagnosis by different physicians, etc. The authors conclude that more research is necessary on the effects of CAFOs on communities, not just on workers or people in the direct vicinity of the facilities.

Citation: [Sigurdarson ST, Kline JN.](#) School proximity to concentrated animal feeding operations and prevalence of asthma in students. *Chest.* 2006 Jun;129(6):1486-91.

DIR Papers of the Month

By Jerry Phelps

Proteomics Responses to Anthrax Lethal Toxin Exposure

NIEHS researchers report in the June issue of *Electrophoresis* progress in understanding how toxins released during anthrax infection adversely affect a variety of cellular processes. According to the paper, this knowledge “should be of great value in understanding and combating this disease.”

Jeffrey Kuhn and Ken Tomer along with colleagues from Agilent Technologies used a proteomics approach to investigate how anthrax disrupts the cell signaling process. The team identified 67 proteins produced after exposure to anthrax lethal toxin in a macrophage cell culture system. Many of the proteins are involved in the oxidative stress response along with apoptotic pathways. The researchers conclude that the tumor necrosis factor pathway is a target in lethal toxin exposed cells. This study also highlights improvements in the laboratory techniques used to isolate and identify the proteins produced in response to toxin exposure.

The most severe form of Anthrax results from inhalation of *Bacillus anthracis* spores which are engulfed or phagocytised by macrophages in the lung. Phagocytosis of bacteria by macrophages is a normal and effective method of the innate immune system to fight the spread of infection. However, in the case of anthrax, the bacteria survive phagocytosis, reproduce within the cells, and use the macrophages as a transport mechanism to invade lymph nodes and eventually the blood stream leading to widespread infection, disease, and death.

Citation: [Kuhn JF, Hoerth P, Hoehn ST, Preckel T, Tomer KB.](#) Proteomics study of anthrax lethal toxin-treated murine macrophages. *Electrophoresis*. 2006 Apr;27(8):1584-97.

Czech Uranium Miners Exposed to Radon are at Higher Risk for Leukemia and Lymphoma

In an epidemiologic study of uranium miners, Dale Sandler and colleagues in the Czech Republic report a statistically significant positive association between radon exposure and leukemia of all causes. They also found that radon exposure is associated with risk for chronic lymphocytic leukemia (CLL), which was previously thought to be unrelated to radiation. Sandler said, “because we studied incidence and not mortality and had relatively long follow-up of miners with good access to medical screening we found this association that has not been seen, but it is plausible that radiation does increase risk for CLL.”

Miners exposed to radon were about twice as likely to develop leukemia. The team also found increased risks for myeloid leukemia and Hodgkin’s lymphoma, but the relative risks were not statistically significant. In this study, there was no association between radon exposure and non-Hodgkin’s lymphoma or multiple myeloma.

The authors conclude that that if their findings are confirmed in other studies, CLL “should be considered an occupational disease in workers with prolonged low-level exposure to radon and perhaps to other kinds of radiation.”

Citation: [Rericha V, Kulich M, Rericha R, Shore DL, Sandler DP.](#) Incidence of leukemia, lymphoma, and multiple myeloma in Czech uranium miners: a case-cohort study. *Environ Health Perspect*. 2006 Jun;114(6):818-22.

Estrogen Receptor Alpha Involved in Estrogen Induced Liver Toxicity

New NIEHS research provides insight into how estrogen exposure during pregnancy, from oral contraceptive use, or from postmenopausal estrogen replacement therapy may cause a liver condition known as intrahepatic cholestasis. Using genetically altered mice lacking the estrogen receptor, researchers determined that the estrogen receptor alpha is involved in the development of the condition. Mice lacking the receptor showed no signs of liver toxicity after being dosed with estradiol. However, wild-type mice treated with estrogen had decreased expression of bile acid and cholesterol transporters. They also found the receptor is involved in shifting the bile acid synthesis toward a more acidic pathway. These findings suggest that estrogen receptor antagonists such as tamoxifen may be used to treat some cases of this condition.

Intrahepatic cholestasis is the most common liver disease during pregnancy and is caused by an impairment of bile secretion in the liver. As the bile backs up in the liver, the level of bile acids increases in the bloodstream. These bile acids are deposited in the skin causing intense itching. Cholesterol, triglyceride, and bilirubin levels are also increased. Elevated bile acids in the blood stream can cause premature delivery and death of the fetus.

Members of the NIEHS Laboratories of Reproductive and Developmental Toxicology and Experimental Pathology performed this research along with colleagues from the National Cancer Institute.

Citation: [Yamamoto Y, Moore R, Hess HA, Guo GL, Gonzalez FJ, Korach KS, Maronpot RR, Negishi M.](#) Estrogen receptor alpha mediates 17alpha-ethynylestradiol causing hepatotoxicity. *J Biol Chem.* 2006 Jun 16;281(24):16625-31. Epub 2006 Apr 10.



Did You Know?

Walking Grants Database, Pam Moore, leaves NIEHS

By Jerry Phelps

A Twenty-eight year veteran of NIEHS, Pam Moore left the Institute in late June to move to Spokane, Wash. with her family. Her husband, John, started a new job there in March. After trying-out the job for a few months, they embraced the idea of discovering a new community together and relocating their family.

Pam is known for her legendary ability to mentally keep track of every grant NIEHS funds or plans to fund. She is also known for her sunny disposition and can-do attitude regardless of her workload. She will be sorely missed by everyone in DERT and her many friends at NIEHS.

Pam plans to find a new position in the federal government as soon as she has settled her family in their new surroundings. She announced at her going away party that her daughter April is expecting a child, so Pam will be visiting the Triangle frequently.

The pictures below were taken at her going away party on June 22.



Pam Moore prepares to slice into a huge chocolate cake at her goodbye party.



Dorothy Duke, Pam's former supervisor, expresses despair at Pam's imminent departure.



Friend and colleague, Cindy Lawler presents Pam Moore with a survival kit for living in the Pacific Northwest.



Co-worker Benny Encarnacion displays the “Mini-Pam” he will keep on his desk to advise him.



Ted Outwater performs a gentle roast of Pam for the DERT audience.

NIEHS “North Campus” Incubates Small Businesses

Prior to completion of the Rall Building in 1984, most of the NIEHS laboratories were located on the “North Campus,” a cluster of buildings and trailers on Alexander Drive nestled between Stonestrow Apartments and Highway 54.

The 30-acre facility is owned by the Research Triangle Foundation. Many of the original buildings have been replaced; however some remain with a new focus. The Foundation is using the site, now known as Park Research Center, as a business incubator and hopes to attract many small biotech companies with attractively priced flexible leases. The Foundation also provides guidance for start ups, including preparing business plans and leads on obtaining private funding.

NIH and NIEHS Mourn Julius Currie

Julius Currie, a long-time grants official at NIH, died of lung cancer at the age of 72 on July 12. Currie was the Chief of the Scientific Review Branch at NIEHS from 1980-1986. He spent the remainder of his career in the Center for Scientific Review (formerly the Division of Research Grants) as an assistant chief in the grant receipt and referral section. Currie, a native of Sanford, N.C., was a graduate of North Carolina A&T University. He earned a master’s degree from Howard University and received a Ph.D. in environmental health sciences from the University of Michigan in 1971. He is survived by his wife of 46 years, Mavis Kennedy Currie, two daughters, two sisters and a grandson.



Julius Currie (photograph courtesy of the NIH Record)

Upcoming Events

The 1st Annual NIEHS Parenting Festival August 7

The Administrative Service & Analysis Branch is proud to sponsor The 1st Annual NIEHS Parenting Festival – The Ultimate Family Resource – which will be held at the Rodbell Conference Center in the Rall Building on Monday, August 7 from 11:00 AM to 2:00 PM. The Parenting Festival has something for all parents regardless of their children’s ages. Featured topics include telecommuting and telework, science careers for teens, bicycle safety information, and First Environments Early Learning Center.



For more information, volunteering opportunities and ideas, contact Inés Palacios at 541-1952 or palaciosi@niehs.nih.gov

African Dance Class—August 9 – September 13

The NIH Office of Equal Employment Opportunity & Diversity Management is sponsoring a 6-week African Dance class. The first class is August 9 from 8-10 AM in Rodbell C. Contact Ginny Ivanoff at 1-3675 for details.

Labor Day Celebration August 29

The NIEHS Diversity Council and the American Federation of Government Employees Local 2923 will host a Labor Day Celebration August 29 at 2:00 PM in Rodbell Auditorium B. The guest speaker will be Eddie Davis, III, President, North Carolina Association of Educators. Davis will speak on the importance of public education in the labor movement.

Summers of Discovery Weekly Seminar Series: “Are soy products estrogens in people, especially baby people?”

Walter Rogan
August 2, 11:00 AM - 12:30 PM
Rall Building-Rodbell B

Functional Variation in Oxidative Stress Genes

Douglas Bell
August 23, 12:00 PM - 1:30 PM
Rall Building-Room D350



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- Director of Communications: [Christine Bruske](#)
- Writer-Editor: [Jerry Phelps](#)