

## Meeting Reports

**Title of Meeting:** Meeting of the Directors of the Ruth L. Kirschstein National Research Service Awards Institutional Research Training Grants (T32)

**Date:** March 27-28, 2013

**Location:** NIEHS

### **Background:**

The meeting of the Directors of the Institutional National Research Service Award T32 Training Grants is held every two years. This year the meeting was focused on the NIEHS Strategic Plan, particularly Strategic Goal 9: "Inspire a diverse and well-trained cadre of scientists to move our transformative environmental health sciences forward and train the next generation of EHS leaders from a wider range of scientific disciplines and diverse backgrounds." The meeting was also designed to inform the Directors about emerging trends in funding, workforce development, and diversity.

Representatives of the 49 funded T32 training programs attended. Also invited to attend were the directors of the three short-term summer research programs for medical students and the four directors of the short-term summer research programs for high school students and undergraduates.

### **Meeting Highlights:**

Dr. Linda Birnbaum opened the meeting with a discussion of the overall NIEHS Strategic Plan and a discussion of developments to date in the NIEHS budget.

Two representatives from the Office of the Director, NIH, (Dr. Henry Khachaturian and Ms. Lisa Evans) discussed NIH level training trends and the recommendations resulting from two workgroups of the Advisory Committee to the Director: the Biomedical Workforce Development, and Diversity in the NIH-funded Biomedical Workforce.

Dr. Gwen Collman, Director, DERT discussed the NIEHS portfolio and the process of setting funding priorities.

Dr. Christie Drew discussed the progress in the development of the CareerTrac program, a structured database to track trainees

The remainder of the meeting was devoted to discussions of the strategic plan and what approaches NIEHS might take to responding to the recommendations. Drs. Carol Shreffler and

Michael Humble set the stage by discussing the six sub-goals and presented questions and approaches which might be considered in response to achieving the goals. Dr. Humble also led a discussion of the omnibus F31 fellowship program and the budgetary approaches NIEHS is considering to deal with the addition of this fellowship option to our NRSA training program.

The Training Directors were divided into two alternating breakout groups for discussion:

Topics:

1. Undergraduate Curriculum Development and Pipeline to graduate training
2. Innovations in training at the graduate, postdoctoral level: Curriculum and developing research training programs in emerging scientific areas; peer review for innovative programs

**Recommendations/Outcomes:**

Support of the F31 Individual Dissertation Grant: All NIH Institutes will be expected to support the omnibus F31 beginning in FY 2015. There is also a proposed stipend increase, particularly at the postdoctoral level. There is no proposed increase in the training budget. NIEHS is proposing a balanced approach including both reducing the number of approved slots on training grants and reducing the success rate. It is also proposed to aim for a 20-25% success rate for individual F31 applications. It is projected that approximately 60 slots for F31 fellows will need to be accommodated and maintained once the F31 program is fully established.

NIEHS should foster cross-disciplinary training in areas that are necessary but underrepresented in EHS (informatics, bio-behavioral, bioengineering, economics, climate change, etc.); recruiting trainees from other disciplines to diversify the science base. NIEHS needs to flesh out what research questions it wants the other disciplines to help answer and what the value these would be to EHS.

NIEHS should consider starting a conversation about programs that target areas outside of toxicology. NIEHS should also consider targeting schools without schools of public health. The directors felt NIEHS should venture into these more uncharted areas using separate stand-alone programs, such as individual F31 training, competitive supplements to add slots, or thesis or small grants bridging two areas, with co-mentorships.

Attendee agreed that more could be done regarding the recommendation to promote integration of EHS researchers into Medical Education to increase the number of physicians or nurse researchers that are trained in EHS.

A question was brought up wondering if we really have a pipeline issue. Has this ever been evaluated? Are we getting the right people with the right skillsets into our pipeline? Masters

training could be a major pipeline into EHS PhD programs. NRSA support is limited to doctoral and higher training, so Masters level support may require another mechanism or support avenue.

Attracting individuals at all levels of education was viewed as important. Bringing science teachers into a summer research experience was seen a valuable endeavor.

A concern was raised that if we want to build pipeline, it can't just be summer programs only and that training should continue throughout the year.

In addition to diversifying the science backgrounds of our trainees, we need to continue to work at expanding the ethnic and racial diversity of our trainees. With 1% of faculty representing minorities, one challenge is the lack of role models in the EHS field. This contributes to the challenge of recruiting diversity applicants. A discussion topic involved the creation of a "Match.com" database for matching a student's interest with a mentoring group within our T32 programs? There was general support for such a program. Also, perhaps matching/partnering could be done between our T32 programs and historically black colleges.

**Title of Meeting:** Mitochondria, Energetics, Epigenetics and DNA Damage Response

**Date:** March 25<sup>th</sup> and 26<sup>th</sup>

**Location:** NIEHS campus

**Introduction/Background:**

The planning group included Fred Tyson, Dan Shaughnessy, Kim McAllister, David Balshaw, Leroy Worth, Astrid Haugen and Lisa Chadwick from DERT, Ray Tice from DNTP, and Bill Copeland from DIR. The purpose of the meeting was to explore the interaction and signaling pathways between mitochondrial and nuclear functions in the response to environmental stress, with a focus on epigenetic regulation and DNA damage response pathways. A more comprehensive understanding of the signaling between mitochondria and nucleus is central to elucidating the role of bioenergetics and other cellular response pathways in modulating the effects of environmental agents. Mitochondrial dysfunction resulting from genetic variants, or from exposure to drugs or environmental toxicants, underlies many diseases. An increasing number of studies indicating that mitochondrial functions are tightly regulated through other cellular processes, including cell cycle control, changes in redox status, nutrient stress, and epigenetic alterations that include changes in methylation of nuclear-encoded mitochondrial genes and acetylation of mitochondrial proteins.

The meeting was opened with introduction by the NIEHS Deputy Director, Rick Woychik, and began with an overview of mitochondrial targets for endogenous and exogenous stressors given by Joel Meyer from Duke University. The next session, on the “Role of Mitochondria Metabolism and Energetics in Epigenetic Regulation” featured a talk on how sirtuins regulate changes in glycolysis and respiration together with responses to DNA damage; a presentation on mitochondrial metabolism and redox regulation through epigenetic changes, including epigenetic control of antioxidant enzymes; a discussion of the importance of metabolites from the citric acid cycle in epigenetic processes; and a talk on development of mitochondrial biomarkers that link air pollution and lead exposures to cognitive outcomes through altered mitochondrial function and methylation of nuclear-encoded mitochondrial genes. Speakers in this session included Raul Mostoslavsky (Massachusetts General Hospital); Frederick Domman (University of Iowa); Scott Bultman (University of North Carolina at Chapel Hill) and Andrea Baccarelli (Harvard University).

The second session featured talks on the interaction between energetics and DNA damage response. Ben Van Houten from the University of Pittsburgh gave an overview talk on the effects of mitochondrial DNA damage and repair on mitochondrial function, highlighting his recently published study of the importance of a mitochondrial fission protein in maintaining normal cell cycle progression. Other talks in this session covered the regulation of DNA damage

response through autophagy mechanisms, based in part on nutrient signaling; the role for the cell cycle protein ATM in normal mitochondrial homeostasis; and a presentation on the interaction of bioenergetics and DNA repair mediated by the PARP enzyme. The other speakers in this session were: Thomas Begley (University at Albany-SUNY); Michael Kastan (Duke University) and Robert Sobol (University of Pittsburgh).

The final session covered aspects of incorporating systems biology approaches to elucidate the interaction of energetics and stress response, including a talk by Matthew Hirschey from Duke University on “omics” approaches, particularly global protein acetylation, to understand integrated responses to stress, and a talk by Trey Ideker from the University of California at San Diego on dynamic interaction maps of protein interactions under changing stress conditions. The final talk, given by Michael DeVito of the National Toxicology Program, underscored the importance of mitochondrial dysfunction endpoints in the results from the Tox 21 screening program.

**Recommendations/Outcomes:**

A half-day discussion session was held on March 26<sup>th</sup> to identify gaps in research, tools, and analytical approaches to address the complexity of mitochondrial-nuclear interactions in response to stress. There was consensus from the group that new tools are needed, including expanded capacity for fluxomic analysis to link changes in metabolism to stress and disease outcomes; development of software/ tools that allow for integrative analyses between energetics and epigenetic processes; and the development of better probes for individual reactive oxygen species. Multi-disciplinary approaches will be critical to studying mitochondrial metabolism and changes in cellular response pathways. Another important theme was how mitochondria are programmed for cell type-specific functions, and whether mitochondria are reprogrammed in iPS cells and differentiated lineages to reflect their in vivo cell type function. The ability to share and analyze large data sets is also essential to these research efforts.

**Title of Meeting:** NIEHS Nano Exposure Workshop

**Date:** January 9-10, 2013

**Location:** NIEHS Campus

**Introduction/Background:**

The number of products in commerce and under development that contain nanomaterials has grown rapidly thus increasing the potential for exposure to nanomaterials at occupational settings and general exposure due to use of nano-enabled products and devices from accidental and incidental exposures. The NIEHS Nano Exposure Workshop was held January 9-10 in Rodbell Auditorium to evaluate the state-of-the-science regarding human exposure to nanomaterials and the potential hazards they may induce allows for evaluating risk and establishing appropriate measures to mitigate risk.

The latest in a series of initiatives led by NIEHS to advance understanding of nanomaterials, the workshop was organized by NIEHS program administrator Sri Nadadur, Ph.D., who manages the nanomaterial grants portfolio. The goal of the workshop was to initiate a discussion with researchers in the fields of nanomaterial science, toxicology, exposure assessment, consumer protection, and epidemiology, to prioritize the research directions for gaining comprehensive understanding of potential health effects from nano-enabled consumer products. Welcoming remarks by NIEHS Deputy Director Rick Woychik, Ph.D., emphasized the urgent need to understand how these materials may interact and contribute to health effects, as the number of products containing nanomaterials continues to increase at a rapid pace.

**Meeting Highlights:**

The workshop was divided into four sessions, each with a set of major questions to guide panel presentations and discussion — nanomaterial environmental health and safety, tools for nanomaterial exposure assessment, consumer exposure to ENMs, and knowledge and needs for epidemiology of ENM exposures.

NTP Deputy Director for Science Nigel Walker, Ph.D. , served in the panel on nanomaterial environmental health and safety, program administrator's David Balshaw, Ph.D., and Caroline Dilworth, Ph.D., moderated the nanomaterial tools session and the and knowledge and needs for epidemiology of ENM exposures, respectively. Consumer Product Safety Commission toxicologist Treye Thomas, Ph.D., moderated the consumer product session.

It remains unclear what the exact volume of ENMs is in production, what products contain them, or how ongoing research and development will change their character in the future — something that expanding public-private partnerships may help address. Initial studies of exposure in occupational settings are only now getting underway, laboratory characterization of nanomaterials is early in development, and epidemiologists struggle with questions about where to begin in the design of the large population studies that are sorely needed to define exposure and forecast risk. Understanding the fate of ENMs, after they enter the body through inhalation, ingestion, and dermal exposure, remains incomplete.

NIEHS Director of the Division of Extramural Research and Training Gwen Collman, Ph.D., spoke encouragingly of the spirit of cooperation evident throughout the workshop. She pointed to offers to share samples and assessment platforms; proposals for cross-disciplinary teams with specialists in toxicology, exposure assessment, and epidemiology; advancing strong interagency partnerships; and the prospect of novel partnerships with private sector stakeholders.

**Title of Meeting:** Building Capacity, Accelerating Scientific Progress

**Date:** February 22-23, 2013

**Location:** Metairie, Louisiana

**Introduction/Background:** Claudia Thompson and Symma Finn attended the Deepwater Horizon (DWH) Consortium Annual Meeting in New Orleans, LA February 22-23rd. They both helped to organize the meeting, and Dr. Thompson presented an overview of the consortium in the first session. The meeting's purpose was to build the capacity and scientific literacy of the community partners as a means of accelerating their participation in the consortium studies and ultimately, the scientific progress of the Consortium. Several of the sessions focused on capacity building and the meeting was organized to be highly interactive.

**Meeting Highlights:** Presentations were geared to the understanding of the community partners and included updates on the four consortium's studies, an overview on the Gulf ecosystem and how oil migrated post-spill, and included presentations by community members on their experience with the research. A poster session focused on the community organizational partners in the consortium and provided an overview of their many activities in support of the Consortium research. Over 80 people attended the meeting, which included over 45 community partners, investigators, and representatives of local public health departments and state and Federal government.

**Recommendations/Outcomes:** The meeting was highly successful in networking community partners across the Consortium, and provided a forum for them to discuss their experiences with the research and an opportunity to meet the investigators. The meeting was also successful in bringing together the investigators to discuss cross-Consortium activities, data collection methodologies, and analytic approaches. Specific recommendations for the consortium moving forward that were noted during the final session included:

- Sustainability of the academic-community partnerships beyond the project term;
- A greater focus on investigations of mental health outcomes in Gulf communities;
- Cultural competence when communicating with affected community members; and,
- Coordination with fishermen regarding messaging about seafood safety.

Overall, the meeting succeeded in building trust, and increased the capacity for research effectiveness across the consortium.

**Title of Meeting:** Society for Applied Anthropology Annual Meeting

**Date:** March 19-23, 2013,

**Place:** Denver, Colorado

**Introduction/Background:** Symma Finn attended the Society for Applied Anthropology Annual Meeting in Denver CO to stimulate interest in environmental health science among social scientists. She organized a session with ES grantee and Society Fellow Tom Arcury entitled, "The incorporation of social sciences in environmental health sciences (EHS) research". The session included an overview of ES funding in social and behavioral sciences by Dr. Finn, and four presentations by ES-funded anthropologists and a sociologist affiliated with Dr. Phil Brown's Superfund Research Program. This included presentations by Tom Arcury, Wake Forest School of Medicine, who spoke on Latino farmworker housing and pesticide exposure; Chris McCarty, University of Florida, who discussed use of social network analysis of communities affected by the Deepwater Horizon oil spill; Kendall Thu, Northern University of Illinois who discussed his research that led to implementation of provisions of the Clean Water Act in Illinois; and a stimulating talk by Sara Wylie, Northeastern, on civic technoscience and low-cost/low-tech collaborations between social scientists and communities in environmental health science studies.

**Meeting Highlights:** There were numerous sessions of relevance to EHS and several presentations by ES-funded investigators. These sessions included pertinent talks on resilience post-disaster; fracking; environmental exposures that lead to health disparities; climate change and human health; built environment, land use and health impacts; and cultural competence and community engagement in research. In total, there were over 40 sessions on topics relevant to research interests at NIEHS; of these sessions 16 related to resilience and recovery from natural and manmade disasters. SfAA and other social scientific professional meetings represent an untapped resource for broadening research goals and considering emerging topics within the social and behavioral sciences that include an environmental component.

**Recommendations/Outcomes:** Positive outcomes from an NIEHS presence at this meeting have already been realized. Speakers presenting in Dr. Finn's session are planning collaborative projects and several of the attendees are inquiring about EHS funding opportunities. Increasing the diversity of research disciplines interested in environmental health research is important, as is incorporating emerging topics in the social sciences as they relate to environmental health. We recommend a continued presence at the SfAA in future years and attendance at other social scientific professional meetings, such as the American Sociological Association Annual Meeting, to continue outreach to investigators and to stimulate interest in EHS.

## Upcoming Meetings

**Title of Meeting:** Environmental Health Disparities & Environmental Justice Meeting: Identifying Priorities for Action

**Date:** July 29-31, 2013

**Location:** National Institute of Environmental Health Sciences, Research Triangle Park, NC

### Meeting Description

NIEHS in partnership with the U.S. Environmental Protection Agency (EPA), National Institute on Minority Health and Health Disparities (NIMHD), Centers for Disease Control and Prevention (CDC), Office of Minority Health (OMH), and Indian Health Service (IHS) have jointly planned and will host a meeting focused on identifying priorities for action to address environmental health disparities (EHD) and environmental justice (EJ). This meeting will bring together researchers, community residents, healthcare professionals, and federal partners committed to addressing EHD and EJ, in particular the grantees funded by NIEHS, EPA, NIMHD, CDC, OMH, and IHS. For the purposes of this meeting, EHD is defined as the unique contribution of the environment to health disparities.

The meeting acknowledges and builds off past meetings that have identified historical EHD & EJ issues and is focused on prioritizing research areas to ensure the most vulnerable populations' issues are addressed. The meeting will also identify emerging EHD or EJ issues (new exposures that have not been considered in the past that may lead to new or additional health disparities).

The meeting will include presentations, small group discussions, demonstrations, and poster sessions that lead to the development of an action agenda. Presenters will highlight challenges, emerging opportunities, and strategies to build upon existing efforts that bring community groups together with researchers. Specifically, the meeting will highlight and promote best practices of current and past EHD and EJ projects, and identify emerging issues and new directions in research, communication, capacity building, training, and evaluation. An additional goal of the meeting will be to foster new partnerships at the local, state, regional, tribal, and national levels. The meeting is also intended to bring together new partners to the discussion of environmental health disparities. Such partners could include: anthropologists, sociologists, and economists as well as those with expertise in law, policy, analysis and evaluation.

### Meeting Objectives

- Develop a set of priorities that enables participants to set multi-year plans to address the most critical EHD and EJ issues
- Set an action agenda for EHD and EJ research that builds off past meetings and current events
- Foster and re-invigorate partnerships from communities to government agencies
- Develop partnerships between communities and environmental scientists with new approaches/disciplines like anthropologists, economist, sociologists

**Title of Meeting:** Summer 2013 WETP Awardee Meeting/CPWR-NIOSH Safety Culture Workshop

**Date:** June 10-12, 2013

**Location:** Washington, DC

The NIEHS WETP will be hosting a semi-annual Awardee Meeting that brings awardees together to provide program updates, exchange information regarding training and discover new areas of interest to awardees. This meeting is being held in conjunction with the NIOSH/CPWR Safety Culture Workshop, which will bring together the best available evidence from academics and practitioners to help define and promote the spread of effective interventions to enhance safety culture/climate, promote worker empowerment, and reduce injuries and illness. The meetings will orient attendees to the key issues and provide useful terms and concepts for additional and more specific discussions during separate track sessions. The outcome of the meetings include, but are not limited to, integrating safety into how work is done and how workers and managers are trained; improving the safety climate; improvement of interventions; collection of best practices; and identification of additional research needs in the area of safety culture.

**Title of Meeting:** 13th International Conference on Combustion By-Products and their Health Effects

**Date:** May 15 -18, 2013

**Location:** New Orleans, LA

<http://www.lsu.edu/piccongress/>

This international meeting, hosted by the Louisiana State University Superfund Center, will bring together academic, government, and industrial representatives to present research findings, update international policy, and discuss critical issues concerning emissions of toxic by-products from combustion processes. Plenary Sessions will include: Respiratory health effects of combustion pollution; Mechanisms linking combustion pollution and cardiovascular toxicity/dysfunction; In situ burning to remediate the gulf oil spill; Environmental sampling: advances, challenges, and implications; In vivo and in vitro dosimetry: implications for respiratory toxicity testing; Human clinical/toxicology studies and epidemiology.

**Title of Meeting:** Airborne Mineral Dust Contaminants: Impacts on Human Health and the Environment

**Date:** May 19 – 22, 2013)

**Location:** Tucson, AZ

This conference, hosted by the University of Arizona Superfund Center, is to bring together scientists who investigate the health effects of dust produced by mine tailings impoundments and smelters and regulators of dust contamination. The speakers consist of experts from the international, US Dust Observations, Federal Government, Mining Industry, and U of A SRP researchers. This will be a 2 day meeting with presentations followed by a discussion of the topic area. The second day will consist of determining future research direction and needs to handle issues of dust as a vector for pollutants, modeling the timing and distribution of dust, and well as health concerns. Topics will include Physical and Environmental Aspects of Dust (global view of airborne mineral dust, ground based observation of mineral dust, satellite remote sensing of mineral dust, modeling and prediction of mineral dust) and Biological and Health Aspects (impacts of dust on air quality, potential levels of exposure to communities).

**Title of Meeting:** Meeting of the Directors of the NIEHS and EPA Children's Environmental Health and Disease Prevention Centers

**Date:** October 28 - 29, 2013

**Location:** Washington DC

The Center Directors will be hosting this meeting on October 28, followed by a joint conference with the EPA CDC Pediatric Specialty Health Units October 29 to 30<sup>th</sup> at the Omni Hotel in Washington DC. There also will be a congressional briefing or panel discussion/reception hosted by NSE Witherspoon, Center Directors and PESHU members on the hill October 30<sup>th</sup>. Not sure if we share that information. Steering Committees have formed and Agendas are in development.

**Title of Meeting:** 2013 CEHC/PEHSU Conference – Protecting Children's Health for a Lifetime: Environmental Health Research Meets Clinical Practice and Public Policy

**Date:** October 29 –October 30, 2013

**Location:** Omni Hotel, Washington, D.C.

**Title of Meeting:** Human Microbiome Science: Vision for the Future

**Date:** July 24-26

**Location:** Bethesda, MD

Research into the human microbiome and its relationship to human health and disease is expanding at a phenomenal rate. The NIH Common Fund Human Microbiome Project has served as the catalyst for this new area of biomedical science, and many NIH Institutes are now evaluating the inclusion of human microbiome activities in their extramural research portfolios. The time is right to assess the state of the science across the many disciplines of this field and to identify the opportunities for, and obstacles to, progress. To meet this need, a planning committee of NIH staff from 14 ICs and a select group of extramural scientists have organized the *“Human Microbiome Science: Vision for the Future”* meeting, to be held July 24-26, 2013 in Bethesda, MD.