Report to the National Advisory Environmental Health Sciences Council

Director, NIEHS

10-11 September 2019

Budget and Legislative Report

STATUS OF FISCAL YEAR 2020 APPROPRIATIONS LEGISLATION

The following table[1] details the current status of proposed Fiscal Year (FY) 2020 appropriations relevant to NIEHS.

Budget Line	FY2019 Enacted Amount[2]	House FY2020 Bill		Senate FY2020 Bill
		Proposed Amount	Δ v FY2019	
NIEHS base budget[3]	$774.707	$812.570	$37.863 (4.89%)	TBD
NIEHS Superfund-related activities[4]	$79.000	$80.000	$1.000 (1.26%)	TBD
DOE Transfer to NIEHS for Nuclear WTP[5]	$10.000	$0	($10.000)	TBD
NIEHS Total	$863.707	$892.570	$1.631 (0.19%)	TBD

[1] Dollars in thousands.

[2] May not reflect the amount actually received at NIEHS due to the application of transfer authority that reduces the amount for all or most ICs.

[3] Funded under the Labor, Health and Human Services, Education, and Related Agencies Appropriations bill.

[4] Funded under the Interior, Environment, and Related Agencies Appropriations bill.

[5] Funded pursuant to Committee Report Language accompanying the Energy and Water Development and Related Agencies Appropriations Act that supports the DOE/NIEHS Nuclear Worker Training Program.

As of July 12, the House of Representatives has passed 10 of the 12 annual appropriations bills for FY2020—that is, all but the Homeland Security and Legislative Branch appropriations bills. The House has passed the other 10 appropriations bills in three tranches described below.

- H.R. 2740, the first "minibus" combining (1) Labor-HHS-Education; (2) Defense; (3) State-Foreign Operations; and (4) Energy and Water appropriations bills. This minibus passed the House by a vote of 226-203 on June 19, 2019. The Labor-HHS-Education bill contains the core appropriation for the NIEHS budget. This minibus also funds the Department of Energy (DOE); it is that portion of the bill that connects to committee report language that has been included in previous years supporting the annual DOE transfer to NIEHS for the NIEHS/DOE Nuclear Working Training Program.

- H.R. 3055, the second "minibus" combining (1) Commerce-Justice-Science; (2) Agriculture; (3) Interior and Environment; (4) Military Construction-Veterans Affairs; and (4) Transportation-HUD appropriations bills. This minibus passed the House by a vote of 227-194 on June 25, 2019. The Interior and Environment bill contains the appropriation for the NIEHS Superfund Research Program and the NIEHS Worker Training Program (entitled "Superfund-related activities" in the annual Congressional Justification (CJ) submitted to the Appropriations Committees). This minibus also contains the appropriations for the FDA, ATSDR, and the Indian Health Service—as well as the EPA, NOAA, NIST, USGS, NASA, NSF, and several other science agencies.

- H.R. 3351, the standalone Financial Services and General Government appropriations bill. This bill passed the House by a vote of 224-196 on June 26, 2019. This bill funds the Executive Office of the President (including OSTP and CEQ), the Department of the Treasury, the Federal Judiciary, and several independent agencies including the CPSC, FCC, GSA, OPM, and the SBA.

These three bills are pending in the Senate as of July 12, 2019. The Senate Appropriations Committee has not, as of this writing, publicly unveiled or marked up any of its versions of the 12 appropriations bills for FY2020. Action in the Senate on appropriations bills is expected in September, and is made more likely given the enactment of H.R. 3877, the "*Bipartisan Budget Act of 2019*," which became Public Law 116-37 on August 2, 2019. This law (1) suspends the public debt limit through July 31, 2021, (2) increases discretionary spending limits for FY2020 and FY2021, and (3) modifies budget enforcement procedures. The House of Representatives passed this legislation by a vote of 284-149 on July 25, and the Senate passed it by a vote of 67-28 on August 1. If Congress is unable to complete action on appropriations bills by October 1, 2019, a "Continuing Resolution" may be considered and enacted in order to continue government operations into FY2020 at FY2019 levels.

Asthma and Air Pollution – Significant Item / Report Language in House Committee Report

The House Committee Report accompanying the House-passed FY2020 Labor-HHS-Education bill contains one Significant Item (SI) for NIEHS, which reads as follows:

> "*Asthma*. —The Committee notes with concern the evidence suggesting a causal link between air pollution and the development of asthma. The Committee urges NIEHS to explore this potential causal link and any interventions necessary to prevent the development of asthma." (H.Rept. 116-62, pg. 98, May 15, 2019).

Harmful Algal Bloom Human Health Research Funding Amendment in House Bill

The House-passed FY2020 Labor-HHS-Education bill also includes one amendment to the NIEHS appropriation that was adopted on the House floor (House Amendment No. 284). The amendment sets aside $6.25 million of the $812.570 million appropriation proposed for NIEHS in the underlying bill for harmful algal bloom (HAB) research in FY2020. This amendment was offered by Representative Vern Buchanan of Florida and was adopted by a recorded vote of 401-23 on June 12, 2019 (Roll Call No. 268). This amendment—including the underlying amount proposed for NIEHS in the House bill—is subject to reconciliation with the Senate before a final bill becomes law.

CONGRESSIONAL CORRESPONDENCE AND INFORMATION EXCHANGE

Interagency Coordination Relative to Plastics and Human Health

On June 5, 2019, Senator Tom Udall of New Mexico and Representative Alan Lowenthal of California wrote the President a letter urging development of a "coordinated interagency research and response plan to address the significant threat that mismanaged plastic waste poses to human health, public budgets, and to the sustainability of our plant and waterways." Both the Senator and Representative are members of the bipartisan International Conservation Caucus which they noted is interested in this issue. NIEHS was asked to provide information about its related activities to help form a reply to the Senator and Representative. NIEHS provided information about its participation in the interagency Nanotechnology Environmental and Health Implications (NEHI) workgroup; its collaboration on approaches to identify and measure nanoplastics in the environment and in various products, including foods; its support of relevant scientific workshops and symposia, including workshops sponsored by the National Academies of Sciences, Engineering, and Medicine (NASEM); and its grant awards to advance research and scientific exchange of information on this topic, including with respect to the regional conference entitled "Impacts of Microplastics in the Urban Environment" that was held in March 2019, at Rutgers University (NIH Project No. R13ES029823).

National Toxicology Program (NTP) and Animal Testing Practices

On July 9, 2019, Representative Ken Calvert of California, the sponsor of the ICCVAM Authorization Act of 2000 (Public Law 106-545) wrote a letter to Dr. Linda S. Birnbaum, Ph.D., the NIEHS and NTP Director, requesting information about NTP work "promoting alternatives to animal testing to better predict human risks" and "to express concerns about a lack of transparency regarding the NTP's animal testing practices." On August 20, 2019, Dr. Birnbaum replied by letter offering to meet with the Representative to discuss this issue in greater detail and ways in which NTP's ability "to do translational research while meeting its social responsibilities to decrease dependence on animals" could be improved. The reply letter also provided information about: (1) the Federal "Toxicology in the 21st Century (Tox21) Program"; (2) the ongoing NTP strategic realignment and transformation in toxicology from a predominantly observational science to one that is more predictive science and human relevant; and (3) the ICCVAM Strategic Roadmap published in January 2018. ICCVAM stands for the Federal Interagency Coordinating Committee on the Validation of Alternative Methods, for which NTP provides administrative support and a leadership role.

Cell Phone Radiofrequency Radiation (RFR)

On August 14, 2019, NIEHS and NTP staff—including NTP Division Scientific Director and NTP Associate Director Dr. Brian Berridge, Dr. John Bucher, Dr. Michael Wyde, and Dr. Mary Wolfe—provided a telebriefing to staff from the Subcommittee on Investigations and Oversight, Committee on Science, Space, and Technology, U.S. House of Representatives, about NTP's cell phone radiofrequency radiation studies.

CONGRESSIONAL BRIEFING

Friends of NIEHS-sponsored Briefing on Children's Environmental Health, Sept. 24, 2019

On September 24, 2019, the Friends of NIEHS—principally the American Academy of Pediatrics, the American Lung Association, the American Thoracic Society, the Society for Birth Defects Research and Prevention, and The Toxicology Forum—are sponsoring a Congressional informational briefing entitled: "A Healthy Start for Every Child: How the Environment Influences Health & Development." This briefing will take place in the Hart Senate Office Building. Dr. Linda Birnbaum, Ph.D., NIEHS and NTP Director, will provide welcoming remarks and an overview of the NIEHS research portfolio on children's environmental health. Dr. Joseph Braun, Ph.D., Associate Professor, Department of Epidemiology, School of Public Health, Brown University, is expected to speak about research investigating associations between PFAS exposures and developmental outcomes in young children (NIH Project No. R01ES025214) and Dr. Nadia N. Hansel, M.D., Associate Dean for Research and Professor, School of Medicine, Johns Hopkins University, is expected to speak about environmental airway diseases such as asthma.

ENVIRONMENTAL HEALTH-RELATED LEGISLATION

The 116th Congress convened on January 3, 2019 and will conclude at the end of calendar year 2020. Since then several environmental health-related bills have been introduced in both the House of Representatives and the Senate. Two of these bills are summarized below.

H.R. 249, Federal Accountability in Chemical Testing Act (FACT Act)

H.R. 249, the "*Federal Accountability in Chemical Testing Act*" or the "*FACT Act*" was reintroduced by Rep. Ken Calvert of California, Rep. Dina Titus of Nevada), and Rep. Vern Buchanan of Florida on January 4, 2019. The bill would require the biennial reports issued by the Congressionally-mandated Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM)—a permanent committee of NIEHS managed by the Division of the National Toxicology Program—to include a description of the progress on the development, validation, acceptance, and utilization of alternative test methods (including animal use data by species, number, and test type) for toxicological testing conducted, supported, or required by each of the 16 ICCVAM-participating Federal agencies during the reporting period. This bill was H.R. 816 in the 115th Congress and had 70 bipartisan cosponsors—50 Democrats and 20 Republicans. The current version has 22 bipartisan cosponsors—17 Democrats and five Republicans. It has been referred to the House Committee on Energy and Commerce, and within the Committee to the Subcommittee on Health where its precursor died in the legislative process at the end of the 115th Congress on January 3, 2019.

H.R. 2050, Appalachian Communities Health Emergency Act of 2019

H.R. 2050, the "*Appalachian Communities Health Emergency Act of 2019*" or "*ACHE Act*" was reintroduced by Rep. John Yarmuth (D-KY) on April 3, 2019. The bill proposes a moratorium be placed on new mountaintop removing mining permits until NIEHS conducts fee-based, mining operation-funded health studies on the issue and the HHS Secretary makes a decision about the health impacts of such operations based on those study results. The bill was first introduced in 2012—during the 112th Congress—and has been reintroduced in every consecutive Congress since. The bill was H.R. 5959 in the 112th Congress (2011-2012); H.R. 526 in the 113th Congress (2013-2014); H.R. 912 in the 114th Congress (2015-2016); and H.R. 786 in the 115th Congress (2017-2018). The current version has 19 cosponsors—all Democrats. The bill remains pending in the House Natural Resources Committee's Subcommittee on Energy and Mineral Resources which held a hearing on April 9, 2019 to receive views on the bill. The Subcommittee heard from four non-federal witnesses, including the President of the Kentucky Coal Association who referenced in his written testimony the 2017 National Toxicology Program systematic review on the subject, two community residents, and Dr. Michael McCawley, Ph.D., an occupational and environmental health professor from West Virginia University.

Science Advances

One NIEHS (NIEHS authors' groups in parens)

- ***Age-related decrease in tyrosine hydroxylase immunoreactivity in the substantia nigra and region-specific changes in microglia morphology in HIV-1 Tg rats.*** *Goulding DR [DIR], A Kraft [NTP], PR Mouton, CA McPherson [NTP], V Avdoshina, I Mocchetti and GJ Harry [NTP]. Neurotox Res* (2019)
  https://doi.org/10.1007/s12640-019-00077-z
  (Th.1 Goal 1)

- ***Downregulation of miR-424 in placenta is associated with severe preeclampsia***. *Tang Q, J Gui, X Wu [NTP] and W Wu [DIR]. Pregnancy Hypertens* (2019) v. 17 pp. 109-112
  https://doi.org/10.1016/j.preghy.2019.05.017
  (Th.1 Goal 1, 2; Th.2 Goal 5)

- ***The Power of Resolution: Contextualized Understanding of Biological Responses to Liver Injury Chemicals Using High-throughput Transcriptomics and Benchmark Concentration Modeling.*** *Ramaiahgari SC [NTP], Auerbach SS [NTP], Saddler TO [NTP], Rice JR [NTP], Dunlap PE [NTP], Sipes NS [NTP], DeVito MJ [NTP], Shah RR, Bushel PR [DIR], Merrick BA [NTP], Paules RS [NTP], Ferguson SS [NTP]. Toxicol Sci. 2019 Jun 1;169(2):553-566.*
  https://www.ncbi.nlm.nih.gov/pubmed/30850835
  (Th.1 Goal 6)

DNTP

- ***Toxicokinetics of perfluorobutane sulfonate (PFBS), perfluorohexane-1-sulphonic acid (PFHxS), and perfluorooctane sulfonic acid (PFOS) in male and female Hsd:Sprague Dawley SD rats after intravenous and gavage administration.*** *Huang MC [NTP], AL Dzierlenga [NTP], VG Robinson [NTP], S Waidyanatha [NTP], MJ DeVito [NTP], MA Eifrid, CA Granville, ST Gibbs and CR Blystone [NTP]. Toxicology Reports* (2019) v. 6 pp. 645-655. https://doi.org/10.1016/j.toxrep.2019.06.016
  (Th.1 Goal 4; Th.2 Goal 5)

- ***Toxicokinetics and bioavailability of sulfolane, a ground water contaminant, following oral and intravenous administration in rodents: A dose, species, and sex comparison.*** *Waidyanatha S [NTP], SR Black, TR Fennell, SL Watson, PR Patel, SD Cooper, J Blake, VG Robinson [NTP], RA Fernando and CR Blystone [NTP]. Toxicol Appl Pharmacol* (2019) [In Press]
  https://doi.org/10.1016/j.taap.2019.114690
  (Th.1 Goal 4; Th.2 Goal 5)

DIR

- ***Association of exposure to artificial light at night while sleeping with risk of obesity in women.*** *Park YM, AJ White, CL Jackson, CR Weinberg and DP Sandler. JAMA Internal Medicine* (2019) https://doi.org/10.1001/jamainternmed.2019.0571
  (Th.1, Goal 1, 7; Th. 2, Goal 1, 3; Th. 3, Goal 1,2, 3)

- ***NF-Y controls fidelity of transcription initiation at gene promoters through maintenance of the nucleosome-depleted region.*** *Oldfield AJ, T Henriques, D Kumar, AB Burkholder, S Cinghu, D Paulet, BD Bennett, P Yang, BS Scruggs, CA Lavender, E Rivals, K Adelman and R Jothi. Nature Communications* (2019) v. 10.
  https://doi.org/10.1038/s41467-019-10905-7
  (Th.1, Goal 1, 7; Th. 3, Goal 1, 3)

- ***JNK(1/2) represses Lkb(1)-deficiency-induced lung squamous cell carcinoma progression.*** *Liu J, T Wang, CJ Creighton, SP Wu, M Ray, KS Janardhan, CJ Willson, SN Cho, PD Castro, MM Ittmann, JL Li, RJ Davis and FJ DeMayo. Nature Communications* (2019) v. 10 [ePub]
  https://doi.org/10.1038/s41467-019-09843-1
  (Th.1, Goal 1; Th. 3, Goal 1, 3)

- ***Distinct RNA-binding modules in a single PUF protein cooperate to determine RNA specificity.*** *Qiu C, RC Dutcher, DF Porter, Y Arava, M Wickens and TMT Hall. Nucleic Acids Res* (2019).
  https://doi.org/10.1093/nar/gkz583
  (Th.1, Goal 1; Th. 3, Goal 1, 3)

- ***Blood DNA methylation and breast cancer: A prospective case-cohort analysis in the Sister Study.*** *Xu Z, DP Sandler and JA Taylor. Journal of the National Cancer Institute* (2019). https://doi.org/10.1093/jnci/djz065
  (Th.1, Goal 1, 2, 7; Th. 2, Goal 1, 3)

- ***Mutational signatures of redox stress in yeast single-strand DNA and of aging in human mitochondrial DNA share a common feature.*** *Degtyareva NP, N Saini, JF Sterling, VC Placentra, LJ Klimczak, DA Gordenin and PW Doetsch. PLoS Biol* (2019) v. 17 (5). https://doi.org/10.1371/journal.pbio.3000263
  (Th.1, Goal 1, 7; Th 2., Goal 1; Th. 3, Goal 1, 3)

- ***Airborne mammary carcinogens and breast cancer risk in the Sister Study.*** *Niehoff NM, MD Gammon, AP Keil, HB Nichols, LS Engel, DP Sandler and AJ White. Environment International* (2019) v. 130. https://doi.org/10.1016/j.envint.2019.06.007
  (Th.1, Goal 1, 3, 5, 7; Th 2., Goal 1; Th. 3, Goal 1)

- ***Therapeutic suppression of pulmonary neutrophilia and allergic airway hyperresponsiveness by a RORgammat inverse agonist.*** *Whitehead GS, HS Kang, SY Thomas, A Medvedev, TP Karcz, G Izumi, K Nakano, SS Makarov, H Nakano, AM Jetten and DN Cook. JCI Insight* (2019) v. 5. https://doi.org/10.1172/jci.insight.125528
  (Th.1, Goal 1; Th. 3, Goal 1, 3)

- ***Cardiomyocyte glucocorticoid and mineralocorticoid receptors directly and antagonistically regulate heart disease in mice.*** *Oakley RH, D Cruz-Topete, B He, JF Foley, PH Myers, X Xu, CE Gomez-Sanchez, P Chambon, MS Willis and JA Cidlowski. Sci Signal* (2019) v. 12 [ePub] https://doi.org/10.1126/scisignal.aau9685
  (Th.1, Goal 1; Th. 3, Goal 1)

- ***A distal super enhancer mediates estrogen-dependent mouse uterine-specific gene transcription of Insulin-like growth factor 1 (Igf1).*** *Hewitt SC, SL Lierz, M Garcia, KJ Hamilton, A Gruzdev, SA Grimm, JP Lydon, FJ DeMayo and KS Korach. Journal of Biological Chemistry* (2019). https://doi.org/10.1074/jbc.RA119.008759
  (Th.1, Goal 1; Th. 3, Goal 1, 3)

DERT

- ***First trimester maternal exposures to endocrine disrupting chemicals and metals and fetal size in the Michigan Mother-Infant Pairs study.*** *Goodrich JM, Ingle ME, Domino SE, Treadwell MC, Dolinoy DC, Burant C, Meeker JD, Padmanabhan V. J Dev Orig Health Dis.* 2019 Aug;10(4):447-458.
  https://www.ncbi.nlm.nih.gov/pubmed/30696509
  (Th.1 Goal 1)

- ***Common E-Cigarette Flavoring Chemicals Impair Neutrophil Phagocytosis and Oxidative Burst.*** *Hickman E, Herrera CA, Jaspers I. Chem Res Toxicol. 2019 Jun 17;32(6):982-985.*
  https://www.ncbi.nlm.nih.gov/pubmed/31117350
  (Th.1 Goal 1, 2)

- ***Mitochondrial stress response in neural stem cells exposed to electronic cigarettes.*** Zahedi A, Phandthong R, Chaili A, Leung S, Omaiye E, Talbot P. 2019. iScience 16:250-269.
  https://www.ncbi.nlm.nih.gov/pubmed/31200115
  (Th.1 Goal 1, 2)

- ***Adaptive introgression enables evolutionary rescue from extreme environmental pollution.*** Oziolor EM, Reid NM, Yair S, Lee KM, VerPloeg SG, Bruns PC, Shaw JR, Whitehead A, Matson CW. 2019. Science 364(6439):455-457.
  https://www.ncbi.nlm.nih.gov/pubmed/31048485
  (Th.1 Goal 1, 3)

- ***Somatic Mutations Increase Hepatic Clonal Fitness and Regeneration in Chronic Liver Disease.*** *Zhu M, Lu T, Jia Y, Luo X, Gopal P, Li L, Odewole M, Renteria V, Singal AG, Jang Y, Ge K, Wang SC, Sorouri M, Parekh JR, MacConmara MP, Yopp AC, Wang T, and Zhu H. Cell. 2019 Apr 2.*
  https://www.ncbi.nlm.nih.gov/pubmed/30955891
  (Th.1 Goal 1)

- ***Association of changes in air quality with incident asthma in children in California, 1993-2014.*** Garcia E, Berhane KT, Islam T, McConnell R, Urman R, Chen Z, Gilliland FD. 2019. JAMA 321(19):1906-1915.
  https://www.ncbi.nlm.nih.gov/pubmed/31112259
  (Th.1 Goal 1)

- ***A small molecule targeting mutagenic translesion synthesis improves chemotherapy.*** Wojtaszek JL, Chatterjee N, Najeeb J, Ramos A, Lee M, Bian K, Xue JY, Fenton BA, Park H, Li D, Hemann MT, Hong J, Walker GC, Zhou P. 2019. Cell; [Online 6 June 2019].
  https://www.ncbi.nlm.nih.gov/pubmed/31178121
  (Th.1 Goal 1, 5)

- ***Evaluating cell lines as models for metastatic breast cancer through integrative analysis of genomic data.*** Liu K, Newbury PA, Glicksberg BS, Zeng WZD, Paithankar S, Andrechek ER, Chen B. 2019. Nat Commun 10(1):2138. https://www.ncbi.nlm.nih.gov/pubmed/31092827
  (Th.1 Goal 1, 2)

- ***Continuing medical education as a translational science opportunity for health communication researchers: the BCERP model.*** Silk KJ, Walling B, Totzkay D, Mulroy M, Smith SW, Quaderer T, Boumis J, Thomas B. 2019. Health Commun; [Online 5 June 2019]. https://www.ncbi.nlm.nih.gov/pubmed/31167573
  (Th.1 Goal 1, 2; Th.2 Goal 4)

- ***Prostate cancer in World Trade Center responders demonstrates evidence of an inflammatory cascade.*** Gong Y, Wang L, Yu H, Alpert N, Cohen MD, Prophete C, Horton L, Sisco M, Park SH, Lee HW, Zelikoff J, Chen LC, Suarez-Farinas M, Donovan MJ, Aaronson SA, Galsky M, Zhu J, Taioli E, Oh WK. 2019. Mol Cancer Res; [Online 16 July 2019]. https://www.ncbi.nlm.nih.gov/pubmed/31221798
  (Th. 1 Goal 4; Th. 2 Goal 5)

NIEHS News and Highlights

Staff Updates

- **Marcos Morgan, Ph.D.,** started his independent career as an Earl Stadtman Tenure Track Investigator in RDBL. His research focuses on understanding mechanisms and role of post-transcriptional gene regulation in development and disease.
- **Benedict Anchang, Ph.D.,** is an Earl Stadtman Tenure Track Investigator in BCBB with a joint appointment in the Center for Cancer Research/NCI. In addition, he was selected as a member of the NIH Distinguished Scholars Program. His research program will focus on developing and applying novel and innovative computational models to better understand normal developmental process, response to environmental exposures and tumor progression using high-dimensional single-cell data.
- **Jackie B. Stillwell** has been approved as the new Director of the NIEHS Ethics Office and Deputy Ethics Counselor. Jackie joined the NIEHS Ethics Office in 2005 and served as the Deputy Director of the Ethics Office from 2011 until 2019, when she was appointed the NIEHS Ethics Director. She began her work at NIEHS in 1988 in the Travel Office and progressed through a variety of administrative positions within the Institute. Notably, she served as Administrative Officer in the Office of the Director, and later as Administrative Officer in the Division of Intramural Research. Ms. Stillwell holds a Bachelor of Science degree from the University of Mount Olive.
- **Richard Kwok, Ph.D.,** is a staff scientist in the Epidemiology Branch at NIEHS and is the Lead Associate Investigator for the GuLF STUDY . The study focuses on the potential health effects of clean-up workers, volunteers, and community members from the Deepwater Horizon disaster. Dr. Kwok joined the NIEHS Epidemiology branch in 2010. Prior to joining NIEHS, Dr. Kwok worked at RTI International and the US EPA. Kwok received his B.S.P.H. in environmental science, and his M.S.P.H. and Ph.D. in epidemiology from the University of

North Carolina at Chapel Hill. Dr. Kwok is currently serving as the Acting Chief of Staff, while Dr. Mark Miller is on detail as Special Assistant to the Deputy Secretary, HHS.

- **David Fargo, Ph.D.,** is officially the Director of Environmental Science Cyberinfrastructure (DESC) as of July 22th. Dr. Fargo served in this role as Acting DESC for more than one year. Dr. Fargo previously served as the NIEHS Scientific Information Officer (SIO), and that vacancy will be filled with a new hire. Dr. Charles Schmitt is chairing the SIO Search Committee to identify candidates for the position. Updates will be provided as more information becomes available on this recruitment.

Spotlight on NIEHS: The Botanical Safety Consortium

Ensuring the safety of botanical dietary supplements is an important public health priority due to widespread use, noted variability in the quality of products in the marketplace, a lack of toxicity data, and reports of adverse events. Botanical products are complex mixtures, which can display significant variability in chemical composition arising from diverse sources including the raw plant material, manufacturing processes, formulation, and storage conditions. This variability combined with the large number of products in the market require efficient and cost-effective toxicity testing options.

The Botanical Safety Consortium is a public-private partnership dedicated to providing a sound scientific basis for the application of fit-for-purpose toxicity testing tools to evaluate the safety of botanical products. The Botanical Safety Consortium emerged from recognition of the shared goal of industry, government, and academic partners to ensure the safety of botanical products and a desire to leverage advancements in analytical chemistry and toxicity testing. The mission of the group is to enhance the botanical safety toolkit and bring clarity to botanical safety assessments for manufacturers and regulators of botanical ingredients. The goals of the group include determining recommended level of chemical characterization for complex botanical products, identifying *in vitro* assays for evaluating toxicity in target systems (e.g., genotoxicity, hepatotoxicity, developmental and reproductive toxicity), evaluating a set of botanical ingredients in the testing battery, and comparing data from the *in vitro* battery to existing animal and human safety data. The steering committee includes representation from the FDA Office of Dietary Supplement Program, NIEHS/NTP, the Council on Responsible Nutrition, Amway, P&G, and the American Botanical Council.

Director's Retrospective: Looking Back and Moving Forward

Looking back over my time at NIEHS through the past decade-plus, I am pleased and honored to have been associated with this outstanding Institute and all its exciting achievements. There are obviously too many accomplishments to list them all. But I would like to note some milestones of our progress that make me particularly happy and proud.

Strategic Planning and Science Management

Let me start by holding up our two Strategic Plans. The Strategic Plans and the process that created them were the clearest evidence at the outset of my tenure of the directions we wanted to take NIEHS. We took important steps to ensure that the process of developing our strategic plan was inclusive and transparent. For both the 2012-2017 Strategic Plan and 2018-2023 Strategic Plan, we identified themes and goals with the help of our stakeholders. Moreover, once the plans were in place, we lived them – showing that our efforts at NIEHS are held accountable against the goals

expressed in our strategic plans. As a result, we have been able to move science forward in in important ways in our priority areas.

Most importantly, our progress has been made in a truly "One NIEHS" fashion. I have emphasized from the start of my tenure the importance of working as far as possible across our divisions: DIR, DNTP, DERT, OM, and OD. I think I can say that our Institute is more truly collaborative and inclusive than it has ever been.

Building on its Strategic Plans, NIEHS can boast of many valuable achievements related to the management of our scientific mission and priorities:

- Established a new Office of Environmental Science Cyberinfrastructure
- High Impacts Tracking System – systematically recording grant outputs and impacts
- Grants Funding Decision Tool - producing faster and more transparent funding plans
- Environmental Health Economics Assessment Tool – providing grantees with resources to expand EH Economics work
- Strengthening efforts to promote the 3Rs—reduction, refinement, and replacement of animal use—by reinventing the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) and leading development of A Strategic Roadmap for establishing New Approaches to Evaluate the Safety of Chemicals and Medical Products in the United States, a resource to guide U.S. federal agencies and stakeholders seeking to adopt new approaches that improve human relevance and replace or reduce animal use.

Areas of Science

The past ten years have been an exciting time in environmental health sciences. As an institute, we have been on the forefront of moving environmental health science forward. From establishing a network of exposure assessment laboratories to opening the Molecular Microscopy Consortium, I would like to highlight some of the areas of science that have taken center stage at NIEHS and NTP.

- Opening the Clinical Research Unit
- Establishment of a national network of exposure assessment laboratories with an innovative grant program called Children's Health Exposure Analysis Resource, which has just morphed into the Human Health Exposure Analysis Resource.
- Focus on windows of susceptibility and Developmental Origins of Health and Disease
- Studies of the role of the microbiome in health and disease; the role of the microbiome in the metabolism of toxic agents and how toxic agents affect the microbiome
- Leadership in metabolomics including the Common Fund Support of the Children's Centers including several Congressional hearings on children's health and the integration with the Health Protection Advisory Committee with EPA
- Diversity outbred mice (J:DO): studies to identify baseline characteristics of J:DO mice as a foundation for evaluating in future toxicological studies potential population dynamics of response relevant to genetically diverse human populations
- Functional Assay development – MEEED and the Genome Integrity Assays (which includes translation into epidemiology)
- 3D Tissue engineering/microphysiological systems/Organotypic Culture Models (with DNTP and NCATS, Woodruff FemKube as key example)
- Development and validation of wearable sensors for epidemiology and citizen science (including SBIR activities)
- Opening of the Neurobehavioral Core

- Genomic dose-response modeling to identify the biological potency of a test article using functional "omic" technologies such as transcriptomics.
- Furthering the Tox21 collaboration of NIEHS, NCATS, and EPA with FDA joining, completing Phase 1--demonstration that high throughput robotic testing can produce high-quality results on 1000s of test articles and Phase 2--expansion of chemical library to >10,000 compounds and introduction of new cell-based assays, and beginning Phase III--development of genomic-based assessment, high-throughput technologies, including the S1500+ gene sets for humans, rats, mouse, and zebrafish and analysis pipelines, to link genomic perturbations in cells and tissues with alternations in biological activity by test articles.
- Adaptation and application of systematic review methodologies to literature-based evaluations in environmental health; evaluations included 1st evaluation using new approach: PFOA/PFOS and immunotoxicity.
- Great expansion of our knowledge and application of epigenetics to environmental health (Target 1 &2, epitranscriptomics, use of epigenetics in epidemiologic studies)
- H3Africa and other global environmental health efforts
- Promoting the concept of complex mixtures and shifting the paradigm from one chemical to mixtures (PRIME – statistical methods) through funding, workshops, and cross-divisional working groups
- Development of new criteria for evaluating strength of the evidence for toxicological outcomes of studies on reproduction, development, and the immune system

Emerging Issues and Disaster Research

At NIEHS, we play an important public health role to recognize emerging environmental health issues and frame our scientific priorities around them. The institute has been a leader in the field of disaster research and response. The Office of the Director has provided strategic leadership and coordination for the Disaster Research Response (DR2) program, but DR2 is truly a One NIEHS effort. In addition to exercises organized by DR2, NIEHS has also developed funding mechanisms to enable scientists to get into the field rapidly following a disaster and providing training and other resources to community members. Over the years, NIEHS has played an important role in studying emerging issues

- Leadership for important trans-NIH research projects following the 2010 Deepwater Horizon oil spill and the 2014 West Virginia chemical spill
- WV Elk River chemical spill program: a yearlong effort using varied experimental approaches--computational, *in vitro*, and *in vivo*--to predict the toxicity of the major and most concerning constituents in the spill and determine the adequacy of CDC's recommended drinking water screening levels at the time of the spill
- Deployment of Worker Training Program (WTP) staff to the disaster zone and training for worker safety and mental health resiliency. Research efforts were also pursued early on.
- The first DR2 exercise in Long Beach with WTP grantee the Western Region Universities Consortium, out of UCLA, including bringing together state and local stakeholders, touring the "impacted region" for an understanding of the density and proximity of industrial plants in Los Angeles, and a tabletop exercise.
- Boston meeting, 2016, to celebrate 50 years of NIEHS and three decades of the Superfund Research Program and the Worker Training Program. Complementing the meeting was a DR2 workshop considering how to initiate health research following a hypothetical flood in the Boston and Chelsea areas

- Chronic Kidney Disease of unknown origin (CDKu) involvement, awareness, and support of workshops and outreach for this emerging environmental health crisis
- Toxicology and carcinogenicity studies of radiofrequency radiation used by cell phones, one of the most technically challenging and expensive studies ever conducted by NTP
- CLARITY-BPA Program: a government-grantee consortium to study the full range of potential health effects from BPA exposure using both guideline and academic studies
- PFAS REACT research program: to assess potential health effects of per- and polyfluoroalkyl substances (PFAS) using multiple facets including experimental animal and cell-based test systems, literature review, and computer modeling, among others.
- Environmental health and environmental justice outreach in Puerto Rico, April 2017, including a tour of neighborhoods affected by increased flooding and a large town hall meeting on environmental health challenges on the island. Rutgers University, a WTP grantee, organized site visits along with their partner Universidad Metropolitana (UMET). The outreach visit was done in coordination with a WTP workshop to explore technologies for training workers who handle hazardous materials, known as hazmat training.

Translation and Dissemination

Given the nature of the work we do at NIEHS and NTP, it is important to effectively disseminate and translate our research findings into public health action. Whether through scientific reports, databases, webinars, curricula, or interagency collaboration, our research findings are made available to researchers, regulatory agencies, and the public.

- Translational Research Framework - Expanding the definition for greater relevance to the environmental health science community
- PEPH Evaluation Metrics Manual – teaching grantees to measure success
- Publication of NTP scientific reports, such as the bi-annual Report on Carcinogens, which presents major scientific analyses of substances in our environment that may cause cancer.
- Expansion of products for disseminating NTP's scientific work to be "fit-for-purpose" including new NTP Technical Report series for studies on reproduction, development, and immune system; NTP Research Reports for activities not covered in traditional report series; scoping reports and evidence maps for exploring exposure/outcome relationships, and NTP updates for web-based, periodic releases of study findings; and bioRxiv pre-print servers as companion to traditional NTP Technical reports series for toxicology/carcinogenesis and toxicity studies, and monographs for cancer and non-cancer literature-based evaluations.
- NTP's work, including its toxicology/carcinogenicity studies, Report on Carcinogens, and NTP monographs on noncancer health outcomes, has been used to support federal and state regulations.
- Creation of the Nonneoplastic Lesion Atlas, a guide for standardizing terminology in toxicologic pathology for rodents

Early Stage Investigators and Training

During my time as director of NIEHS, one of the things I have enjoyed the most is meeting with our trainees and students at grantee meetings and university visits. I have been delighted to provide support and encouragement for young scientists and early stage investigators. NIEHS has been able to provide support for early stage investigators through many different mechanisms and we continue to study and build on our success.

- More funding for early stage investigators through the Next Generation Research Initiative (NGRI).
- The Outstanding New Environmental Scientist Award (ONES) program, through which NIEHS is able to cultivate America's future environmental health research leaders at the start of their careers.
- Innovative training opportunities such as the tri-mentored postdoctoral fellowship program, in which trainees received mentorship from around the institute, not just a single laboratory.
- CareerTrac trainee tracking system – partnering with 4 Institutes and nearly 35,000 trainees (received Directors Award in 2013)
- Since 2012, the NIEHS Scholars Connect Program has recruited undergraduate students from underrepresented groups for research training and mentorship at NIEHS through paid internships for three semesters, beginning in June. The program supports the NIEHS Strategic Plan goal of promoting a diverse environmental health science workforce by encouraging scholars to pursue careers in the field, or in science, technology, engineering, and math.

In addition, NIEHS provides training to employees with programs such as the NIEHS Leadership Development Program (NLDP), which began in 2012.

- The NLDP is a unique program that allows participants to develop their leadership skills and experience through interactive seminars, group discussions, individual coaching, and projects. The 9-month long program includes sessions focused on leadership strategies and skills, the opportunity to work on real-life challenges facing NIEHS, lunch-and-learn sessions, individual assessments, and one-on-one coaching throughout the program. There have been 7 total cohorts – some for supervisors, others for non-supervisors – with a total of 165 participants.
- We are about to begin our first 'junior' program called the Professional Development Program. This program will be for candidates up to GS-11.

Community Engagement
Recommitment to community engagement, environmental public health, and environmental literacy has been very important. Participation in community and virtual forums has increased accessibility to communities across the country. NIEHS has continued to engage with the community through:

- Work with environmental justice communities
- Champion of participation of Community members and stakeholders in the research enterprise; Mandated community engagement cores in all of our Centers programs (i.e. P30, Superfund, Children's Centers, Breast Cancer Centers, Oceans and Human Health); fully supportive and engaged with Partnership of Environmental Public Health; expanded concepts of environmental health literacy and citizen science
- The commitment to environmental health issues in Indian Country – raising the visibility of NIEHS and becoming a trusted partner among Tribal and Alaskan Native Nations.

Employee Engagement
From 2013 to 2018, NIEHS has seen its Employee Satisfaction Index score increase from 60% to 77% as well as a 28% increase in employee participation in the Federal Employee Viewpoint

Survey (FEVS). In my time as director, I have tried to adopt an "open door" policy and encourage work-life balance, including the use of alternative work schedules, maxiflex, and teleworking.

Management and Facilities
Over the past 10 years, NIEHS has made great strides to reduce its environmental footprint. In that time, we have developed and opened the first Leadership in Energy and Environmental Design (LEED) Platinum and Net-Zero Energy building in HHS history. In addition, recycling and composting efforts have directed 4593 tons (that is almost 9.2 million pounds!) of material from the landfill. NIEHS has taken a leadership role in understanding and promoting sustainability including:

- Releasing our first Sustainability Report in 2009
- NIEHS's sustainability efforts were recognized with the HHS 2009 Organization Green Champion Award. This was the first time HHS had given the award to an entire organization.
- In the 9 years since the program has been in place, NIEHS in concert with the Office of Research Facilities (ORF) has received 13 HHS Green Champion Awards and 3 honorable mentions.
- Developing the first Climate Resiliency Plan at NIEHS
- Completed the A Basement Renovation to construct a training facility and enlarged fitness center
- Planning for construction of a new Clinical and Computational Research Building (CCSB)
- Developed and implemented a new web-based environmental and safety data system that makes business processes more efficient and improves information tracking, reporting, and sharing

Leadership Appointments
I am especially proud that I have had the opportunity to build a strong leadership team to keep the institute moving forward.

- Dr. Rick Woychik – Deputy Director, and will serve as the acting Director until a national search identifies a new Director
- Dr. Darryl Zeldin – Scientific Director of the Division of Intramural Research
- Dr. Brian Berridge – Associate Director of the National Toxicology Program and Scientific Director of the Division of the National Toxicology Program
- Dr. Gwen Collman – Director of the Division of Extramural Research and Training
- Dr. Janet Hall – Clinical Director
- Chris Long – Executive Officer

Meetings and Events

- **Past Events**
    - Experts from environmental health sciences and other fields gathered June 6-7 in Washington, D.C. to explore how artificial intelligence (AI) can help solve challenges in environmental health sciences. The NIEHS-funded **NASEM Emerging Advances in Artificial Intelligence for Environmental Health Research and Decisions Workshop** was sponsored by the National Academies of Science, Engineering, and Medicine (NASEM). NIEHS Deputy Director Rick Woychik, Ph.D.,

described ongoing environmental health studies that use AI and related computational techniques. Organizers invited a range of scientists to present AI applications in environmental epidemiology, chemical hazard assessment, and fields beyond environmental health sciences. The meeting also featured practical sessions. NTP computational toxicologist Nicole Kleinstreuer, Ph.D. and Charles Schmitt, Ph.D., head of the NIEHS Office of Data Science served on panels. **(Th.1 Goals 6, 7; Th. 2 Goals 1)**

- Dr. Linda Birnbaum provided the first keynote speech at the **2nd National Conference on Per- and Polyfluoroalkyl Substances** that was held June 10-12 in Boston, MA. The purpose of the conference was to foster relationships between government, academic. NGO, and community groups to better support communities impacted by PFAS contamination. The conference was hosted by the Social Science Environmental Health Research Institute at Northeastern University. **(Th. 1 Goals 3, 5; Th. 3 Goal 3)**
- Concerns about water quality took center stage in Mt. Vernon, Iowa June 19 when NIEHS and National Toxicology Program Director Linda Birnbaum, Ph.D., and others from the Institute held a public meeting in the community. The University of Iowa Environmental Health Science (EHS) Research Center sponsored the event, which included farm tours for NIEHS scientists, core center colleagues, and community members. The **community forum** was followed by the **NIEHS Core Centers Annual Meeting. (Th. 2 Goals 2, 5, 6; Th. 3 Goal 3)**
- The what, when, and how of preventing exposures that are likely contributing to the development of cancer was the question explored during a June 22-24 conference, where NIEHS Deputy Director Rick Woychik, Ph.D., presented a keynote address. **Environmental Carcinogenesis: Potential Pathway to Cancer Prevention** was organized by the American Association for Cancer Research (AACR) and held in Charlotte, North Carolina. Gwen Collman, Ph.D., director of the NIEHS Division of Extramural Research and Training, chaired a session on new ways to measure exposure to carcinogens**. (Th. 1 Goals 3, 4, 5; Th. 2 Goals 2, 3)**
- The **Society of Toxicologic Pathology's (STP) annual meeting** took place in Raleigh, NC June 22-27. Because of the society's interest in the interplay of One Health, the environment, and toxicants, it made sense for our own director, Linda Birnbaum, Ph.D., to be invited as the keynote presenter. The conference schedule was also chock full of other talks by researchers from NIEHS and the National Toxicology Program (NTP). Mike Wyde, Ph.D., and Mark Cesta, D.V.M., Ph.D., drew a large crowd to their overview of cell phone radio frequency radiation studies in rats and mice. Darlene Dixon, D.V.M., Ph.D., from NTP, chaired a session on endocrine disruptors and reproduction. Panelist Wendy Jefferson, Ph.D., from NIEHS, discussed exposures to estrogen during early development. Michelle Cora, D.V.M., presented data from the NTP class comparison study of seven per- and polyfluoroalkyl substances (PFAS) in rats. **(Th. 1 Goals 1, 2, 6)**
- Dr. Linda Birnbaum delivered the Deichmann Keynote Lecture at the **15th International Congress of Toxicology meeting** in Honolulu, HI. The meeting took place July 15-18. Dr. Birnbaum's lecture entitled "Human Health and the Environment: Global is Local *is* Personal" spoke to the theme of the meeting – "Toxicology Solutions for Global Public, Environmental, and Personal Health." Dr.

Brian Berridge, Associate Director of NTP, and Dr. Nicole Kleinstreuer, Deputy Director of NICEATM**,** also presented during the meeting's symposia, and many other NIEHS and NTP scientists provided Platform Presentations. **(Th. 1 Goal 6; Th. 2 Goal 3; Th. 3 Goal 3)**

- NIEHS co-sponsored the **Society for the Study of Reproduction's (SSR) 52nd Annual Meeting** held in San Jose, CA July 18-21. Dr. Carmen Williams, Deputy Chief of the Reproductive & Developmental Biology Laboratory (RDBL)**,** co-chaired the event, with a meeting theme of "Beyond Possible: Remarkable Transformation of Reproductive Biology." During the meeting, Dr. Humphrey Yao, Senior Principle Investigator in RDBL, was presented the 2019 SSR Research Award and Dr. Sally Darney, Editor-in-Chief of *Environmental Health Perspectives* received the 2019 SSR Jansen Distinguished Service Award. **(Th. 1 Goal 1, 2)**
- Dr. Linda Birnbaum provided the opening keynote at the **Environmental Risk Assessment of PFAS: SETAC North America Focused Topic meeting** held in Durham, NC August 12-15. Dr. Christopher Weis was on the organizing committee of the meeting. The objective of the meeting was to review new and emerging information on PFASs and to formulate a roadmap for a risk assessment approach for PFAS. The meeting was organized around the following topic areas related to PFAS: environmental sources, chemistry, fate and transport; exposure; ecological toxicity; human toxicity; and risk assessment and characterization**. (Th. 1 Goal 1; Th. 2 Goal 3, 5; Th. 3 Goal 3)**
- Scientists from around the world gathered for the 31st Annual **Conference of the International Society for Environmental Epidemiology (ISEE 2019) held in** Utrecht, The Netherlands on August 25-28. NIEHS provided support for the meeting and NIEHS scientists and grantees served on organizing committees and convened symposia. The meeting's theme was "On Airs, Waters, Places" in recognition of the first surviving text on environmental health, written by Hippocrates of Kos. Research presented at the meeting discussed the history and future of environmental epidemiology. **(Th. 1, Goal 5; Th. 3 Goal 4)**
- **The Fidelity of DNA Replication: From Basic Mechanism to Disease Symposium,** held in Research Triangle Park on August 29-30, was organized to honor the scientific contributions of Thomas Kunkel, Ph.D., an NIH Distinguished Investigator, to the fields of DNA replication and repair. The symposium focused on current advances in the studies of processes that control DNA synthesis and repair in order to preserve cell viability and genome stability, and how they can be perturbed by environmental stress to lead to human disease. The meeting brought together junior and senior investigators, including previous postdocs from the Kunkel lab, postdoctoral fellows and graduate students from the local universities and the NIEHS, as well as distinguished scientists from institutions outside North Carolina. **(Th. 1 Goal 1, 2; Th. 3 Goal 1, 3)**

- **Upcoming Events**
  - **Environmental Mutagenesis and Genomics Society 50th Annual Meeting,** Washington DC, September 19-23

- **Identifying Opportunities to Understand, Control, and Prevent Exposure to PFAS: A Workshop of the Environmental Health Matters Initiative,** NASEM, Washington DC, September 26-27
- **Duke University Superfund Center Fall 2019 Symposium**, Durham NC, October 11
- **Triangle Global Health Consortium Annual Conference,** Durham NC, October 16
- **Reproductive Epidemiology – Past, Present, and Future,** NIEHS, October 18
- **American Public Health Association Annual Meeting and Expo,** Philadelphia PA, November 2-6
- **SETAC North America 40th Annual Meeting,** Toronto Canada, November 3-7
- **17th Annual NIEHS Science Days,** RTP, November 7-8
- **2019 SRP Annual Meeting,** Seattle WA, November 18-20
- **Federal Lead Action Plan Goal 4: Research Needs Interagency Workshop**, NIH, Bethesda, MD, December 4-5
- **PEPH Annual Meeting,** NIEHS, February 12-14, 2020
- **Estrogen Receptor Hormone Action Symposium,** NIEHS, March 20, 2020
- **5th International Conference on One Medicine Once Science (iCOMOS 2020),** Santiago, Chile, April 19-22, 2020

Awards and Recognition

- **NIEHS**
  - **2019 DIR Scientific Director's Award for Excellence -** The award recognizes 2 principal investigators that the BSC deemed to be the most outstanding Senior Investigator and Tenure-track Investigators reviewed in FY18. The awardees each receive $100K in supplemental funding for their research programs.
    - **Dr. Thomas Kunkel,** NIH Distinguished Investigator, Genome Integrity & Structural Biology Laboratory
    - **Dr. Shanshan Zhao,** Tenure-track Investigator, Biostatistics & Computational Biology Branch
  - **NIH Director's Award**
    - **INCLUDE Project Leadership Team**
      For extraordinary efforts to develop and launch a Trans-NIH initiative addressing the health and quality-of-life needs for individuals with Down syndrome and its co-occurring conditions
      NIEHS recipient (as part of a trans-NIH team): Jonathan Hollander
    - **Postdoctoral Career Outcomes Initiative**
      For exceptional creativity and initiative in developing international standards for reporting postdoctoral career outcomes and in developing a novel interactive dashboard for visualizing these outcomes
      NIEHS recipients: Tammy Collins, Hong Xu
    - **Hurricane Florence Response Team**
      For extraordinary leadership in preparing for and responding to Hurricane Florence
      NIEHS recipients: Monya Brace, Matthew Burr, Megan Irias, Julie Nixon, Mitch Williams
      Other recipient: Terry Wells (ORF)

- **NIH Equity Committee**
  For establishing the NIH Equity Committee as a forum for identifying and disseminating best practices in intramural research resource allocation
  NIEHS recipient (as part of a trans-NIH team): Trevor Archer
- **Sound Health Trans-NIH Leadership Team**
  For outstanding leadership/multi-partner collaboration on the Sound Health Trans-NIH Leadership Team for their extraordinary efforts in advancing the goals of the Sound Health Initiative
  NIEHS recipient (as part of a trans-NIH team): Laura Thomas
- **The Agricultural Health Study Research Team**
  For sustained cross-IC collaboration in leading efforts to understand the health of farmers and their families
  NIEHS recipients (employees): Christine Parks, Dale Sandler
  Other recipients: Honglei Chen, Cynthia Hines, Jane Hoppin, Freya Kamel, Charles Lynch, Kent Thomas, Michael Alavanja, Gabriella Andreotti, Laura Beane Freeman, Aaron Blair, Jonathan Hofmann, Stella Koutros, Jay Lubin
- **Trans-NIH ME/CFS Working Group on Communication and Outreach**
  In recognition of efforts supporting awareness and activities that advance Myalgic Encephalomyelitis / Chronic Fatigue Syndrome (ME/CFS) research
  NIEHS recipient (as part of a trans-NIH team): Michael Humble

- **HHS Green Champion Awards**
  - **Water Use Efficiency:** NIEHS Vivarium Water Reduction Project
    Neil Grove, Debbie Gaffney, Don Jackowski, Lee Howell, Gordon Caviness, Bill Blair, Kathy E. Laber
    The NIH NIEHS Comparative Medicine Branch (CMB) team took measures to reduce water use associated with vivarium cage wash operations. Following study and analysis, CMB purchased and installed a new high-efficiency cage and rack washer to support a portion of its cage processing operations. Additionally, CMB has adopted the use of high-efficiency, high-performance cage and husbandry equipment and optimized cage management practices, further reducing water demands. The cage processing operations that are being supported by this new equipment and improved practices are projected to reduce water use by over 80%, saving an estimated 167,000 gallons of water annually.
  - **Green Hero Video:** The NIEHS Environmental Management System (EMS) Awareness Training Project
    Bill Steinmetz, Paul Johnson, Bill Fitzgerald, Ann Thompson, Joe Poccia, Tony Hall, David Christie, John Maruca, Paul Cacioppo
    The NIH National Institute of Environmental Health Sciences (NIEHS) developed a unique web-based interactive training program to support efforts to reduce environmental impacts, increase awareness of sustainable practices, and promote our campus Environmental Management System (EMS). The training program was produced through a team effort that combined skill sets from the NIEHS EMS Work Group, our on-site arts and photography contractors, along with creative graphics design personnel.
  - **NIH Green Labs Program**

Trisha Castranio from NIEHS; ***Susan Hinton***, ***John Prom***, ***David Mohammadi***, ***Tierra Robinson***, ***Jaroslav Sebek***, ***Bani Bhattacharya***, from the NIH Department of Environmental Protection; ***Minoo Shakoury-Elizeh*** and ***Daman Kumari, Ph.D.***, from the National Institute of Diabetes, Digestive and Kidney Diseases; and ***Barbara Zwiesler***, from the National Institute on Deafness and Other Communication Disorders.

The Green Lab practices addressed chemical, medical pathological, and radioactive waste, energy and water conservation, freezer management, waste reduction, recycling, green chemistry, inventory management, and outreach. The group recognized high-achieving labs with a Green Lab Certificate. In 2018, which was the first year of the program, 46 labs under the direction of 17 lead researchers earned a certificate.

- **NIH Poster Day Outstanding Poster Winners**
  - **Aidin Alejo Abdala** — Immunity, Inflammation, and Disease Laboratory
  - **Lauren Carlson** — Clinical Research Branch
  - **Gabrielle Childers** — National Toxicology Program (NTP) Laboratory
  - **Brian Elgart** — Signal Transduction Laboratory
  - **Olivia Emery** — Reproductive and Developmental Biology Laboratory
  - **Jacob Gordon** — Signal Transduction Laboratory
  - **Ahmed Mashal** — NTP Laboratory and Cellular and Molecular Pathology Branch
  - **Tejas Patel** — Genome Integrity and Structural Biology Laboratory
  - **Jeanne Powell** — Neurobiology Laboratory
  - **Julian Rana** — Genome Integrity and Structural Biology Laboratory
- **Presidential Early Career Award for Scientists and Engineers:** The PECASE is the highest honor bestowed by the United States Government to outstanding scientists and engineers who are beginning their independent research careers and who show exceptional promise for leadership in science and technology.
  - **Chandra Jackson**, Ph.D., M.S., Tenure-Track Investigator in the Epidemiology Branch, NIEHS
  - **Jennifer Martinez**, Ph.D., Tenure-Track Investigator in the Inflammation and Autoimmunity Group, NIEHS
- **Pathways to Independence Award (K99/R00)**
  - **Dr. Natale Sciolino,** an IRTA Fellow in Dr. Patricia Jensen's group, was awarded a K99/R00 grant from NIDDK.
  - **Dr. Monica Pillon**, a Visiting Fellow in Dr. Robin Stanley's group, will be awarded a K99/R00 grant from NIEHS
- **NIGMS Postdoctoral Research Associate Training (PRAT) Program**
  - **Dr. Elizabeth Martin** was selected as a PRAT Fellow and will be mentored by Dr. Paul Wade in ESCBL. The NIGMS PRAT Program is a competitive three-year postdoctoral fellowship program designed to prepare trainees for leadership positions in their independent scientific careers.

- **NIEHS FARE 2020 Winners**
  - **Bevin Blake, M.S.**
    "Gestational exposure to the perfluorooctanoic acid replacement, GenX, induces adverse responses in maternal weight gain and placental health in CD-1 mice"
    Study Section: Pharmacology and Toxicology/Environmental Health
    Mentor: Dr. Suzanne Fenton
    Lab: National Toxicology Program Lab
  - **Qing Chen, Ph.D.**
    "Post-transcriptional Control of mouse embryonic stem cell maintenance by Ccr4-Not complex"
    Study Section: Stem Cells - General and Cancer
    Mentor: Dr. Guang Hu
    Lab: Epigenetics & Stem Cell Biology
  - **Alicia Chi, Ph.D.**
    "WNK1 in the Uterus: A Previously Undescribed Role In Mediating Implantation"
    Study Section: Endocrinology
    Mentor: Dr. Francesco Demayo
    Lab: Reproductive & Developmental Biology
  - **Irina Evsyukova, Ph.D.**
    "Developmental Disruption of Locus Coeruleus-Norepinephrine Signaling Results in Male-Specific Behavioral Phenotypes Relevant to Neurodevelopmental Disorders"
    Study Section: Neuroscience - Developmental
    Mentor: Dr. Patricia Jensen
    Lab: Neurobiology
  - **Wei Fan, Ph.D.**
    "The role of SIRT1 in regulating embryonic stem cell sphingolipid metabolism and neural development"
    Study Section: Cell Biology - General
    Mentor: Dr. Xiaoling Li
    Lab: Signal Transduction
  - **Yi Fang, Ph.D.**
    "Histone Crotonylation Promotes Endodermal Commitment of Pluripotent Embryonic Stem Cells"
    Study Section: Epigenetics
    Mentor: Dr. Xiaoling Li
    Lab: Signal Transduction
  - **Symielle Gaston, Ph.D.**
    "Childhood Chemical Hair Product Usage and Early Menarche among African-American Women"
    Study Section: Cultural Social and Behavioral Sciences
    Mentor: Dr. Chandra Jackson
    Lab: Epidemiology Branch
  - **Chunfang Gu, Ph.D.**
    "Understanding the health benefits of quercetin and other dietary flavonoids: selective inhibition of an inositol polyphosphate kinase"
    Study Section: Pharmacology and Toxicology/Environmental Health

Mentor: Dr. Stephen Shears
Lab: Signal Transduction

- **Dhirendra Kumar, Ph.D.**
  "ProteoGE: A proteogenomic tool for integrating proteomic, genomic and epigenomic data to discover novel protein-coding genes"
  Study Section: Informatics/Computational Biology
  Mentor: Dr. Raja Jothi
  Lab: Epigenetics & Stem Cell Biology
- **Xingyao Li, Ph.D.**
  "Signal transduction and nutrient balance: regulation by inositol pyrophosphates of the cellular transport of inorganic phosphate"
  Study Section: Physiology
  Mentor: Dr. Stephen Shears
  Lab: Signal Transduction
- **Wan-Chi Lin, Ph.D.**
  "Epithelial Membrane Protein 2 is required for fibrosis and tissue remodeling in the lung"
  Study Section: Physiology
  Mentor: Dr. Micheal Fessler
  Lab: Immunity, Inflammation & Disease
- **Jingli Liu, M.D. & Ph.D.**
  "A nongenomic mechanism for "metalloestrogenic" effects of cadmium in human uterine leiomyoma cells through G protein-coupled estrogen receptor"
  Study Section: Pharmacology and Toxicology/Environmental Health
  Mentor: Dr. Dixon Darlene
  Lab: National Toxicology Program Lab
- **Daisy Lo, Ph.D.**
  "Unraveling the mechanism of substrate processing by the AAA-ATPase Rix7"
  Study Section: Protein Structure/Structural Biology
  Mentor: Dr. Robin Stanley
  Lab: Signal Transduction
- **Kathleen McCann, Ph.D.**
  "H/ACA snoRNAs are determinants of stem cell homeostasis"
  Study Section: RNA Biology
  Mentor: Dr. Traci Hall
  Lab: Epigenetics & Stem Cell Biology
- **Angelico Mendy, M.D. & Ph.D.**
  "Association of Urinary Levels of Bisphenols F and S Used as Bisphenol A Substitutes with Asthma Outcomes"
  Study Section: Epidemiology/Biostatistics - Prognosis and Response Predictions
  Mentor: Dr. Darryl Zeldin
  Lab: Immunity, Inflammation & Disease
- **Monica Pillon, Ph.D.**
  "Structural Basis for Active Site Coordination Within a Multienzyme pre-rRNA Processing Complex"
  Study Section: Protein Structure/Structural Biology
  Mentor: Dr. Robin Stanley
  Lab: Signal Transduction

- **Prashant Rai, Ph.D.**
  "Chronic type I interferon excess disrupts tissue macrophage homeostasis in vivo"
  Study Section: Immunology - Autoimmune
  Mentor: Dr. Michael Fessler
  Lab: Immunity, Inflammation, and Disease
- **Yun-Gil Roh, Ph.D.**
  "GLIS2 causes kidney fibrosis through transcriptional regulation of cell migration- and immune cell recruitment-related genes"
  Study Section: Gene Expression
  Mentor: Dr. Anton Jetten
  Lab: Immunity, Inflammation & Disease
- **Chitrangda Srivastava, Ph.D.**
  "The transcriptional mediator JAZF1 plays a critical role in regulating metabolic syndrome and adipocyte differentiation"
  Study Section: Endocrinology
  Mentor: Dr. Anton Jetten
  Lab: Immunity, Inflammation & Disease
- **Zhenzhen Wang, Ph.D.**
  "Design and application of LED-activated, thermolabile lipid nanocarriers for delivery of polyphosphate cell-signals into cell cytoplasm"
  Study Section: Biochemistry - General, Proteins, and Lipids
  Mentor: Dr. Stephen Shears
  Lab: Signal Transduction
- **Hongyao Yu, Ph.D.**
  "INO80 Regulates Chromatin Landscape and Transcription to Maintain the Primed Pluripotent State"
  Study Section: Chromatin and Chromosomes
  Mentor: Dr. Guang Hu
  Lab: Epigenetics & Stem Cell Biology Laboratory
- **Fei Zhao, Ph.D.**
  "The Remain of the Male: Unexpected Contribution of the Male Tract Mesenchyme to the Female Reproductive Tract"
  Study Section: Developmental Biology
  Mentor: Dr. Humphrey Yao
  Lab: Reproductive & Developmental Biology
- **Jingheng Zhou, Ph.D.**
  "Silencing Dopamine Neurons During Sleep as a Potential Therapeutic Strategy for Parkinson's Disease"
  Study Section: Neuroscience - Neurological and Neurodegenerative Disorders and Injury
  Mentor: Dr. Guohong Cui
  Lab: Neurobiology

- **2019 SSR Trainee Research Finalists – Poster Competition**
  - **Yeong Seok Oh, Ph.D.**, Visiting Fellow
    "The Role Of COUP-TFII In the Uterus During the Pre-Implantation Period"
    Lab: Reproductive and Developmental Biology
  - **Rong Li, Ph.D.**, IRTA Fellow

"Overexpression of Progesterone Receptor A or B Isoform in Uterine Epithelium Disrupts Embryo Implantation by Altering Leukemia Inhibitory Factor-Forkhead Box Protein O1 Signaling"
Lab: Reproductive and Developmental Biology

- **2019 SSR Trainee Travel Award**
  - **Ciro Amato, Ph.D.**, IRTA Postdoctoral Fellow
    Lab: Reproductive and Developmental Biology

- **Grantees/Others**
  - **Revolutionizing Innovative, Visionary Environmental Health Research (RIVER)**
    - **Manish Arora, Ph.D.,** from Icahn School of Medicine at Mount Sinai, and his team have proposed a theory — the Biodynamic Interface — that describes an interface between the environment and the human body. By applying this theory and newly developed technology to disorders that appear at all stages of life, the team hopes to develop early warning systems to predict, and perhaps even prevent, diseases decades before any clinical signs are apparent.
    - Epoxy fatty acids (EpFAs), including omega-3 fatty acids, are part of natural biological processes that maintain health**. Bruce Hammock, Ph.D.**, from the University of California, Davis (UCD), studies how chemical exposures and other factors disrupt these processes and lead to disease. He is also developing approaches to stabilize EpFAs to prevent and treat diseases. In animal models, some substances that inhibit the breakdown of EpFAs are helpful for treating pain, cancer, Parkinson's disease, and other diseases.
    - **Patricia Opresko, Ph.D.**, from the University of Pittsburgh, and her team developed an innovative tool that uses light and small molecule probes to damage specific DNA sequences in telomeres. Using this technology, her research team studies how telomere damage occurs and how it leads to disease.
    - **Kim Tieu, Ph.D.**, from Florida International University, will study the role of dynamin-related, protein-1 (Drp1) in Parkinson's disease. Drp1 is a protein that plays a role in the splitting of mitochondria, which are the energy-producing component in cells.
    - **Wen Xie, M.D., Ph.D.**, at the University of Pittsburgh, is studying receptors that can bind xenobiotic factors, or factors from outside the body, such as environmental chemicals. The same receptors can also bind factors that exist naturally inside the body, or endobiotics. His research team will study how xenobiotic receptors, including the xenobiotic nuclear receptors pregnane X receptor (PXR) and constitutive androstane receptor (CAR) and the PAS domain transcriptional factor aryl hydrocarbon receptor (AHR), regulate the ability to break down environmental chemicals and how the receptors regulate normal body functions.
    - **Mark Zylka, Ph.D.**, from the University of North Carolina at Chapel Hill, is leading a three-pronged approach to identify exposure risks and individuals susceptible to or having autism spectrum disorder. First, his team will identify environmental chemicals and mixtures that target molecular

pathways involved in neurodevelopment. Second, a network of researchers will characterize real-world exposures to these chemicals. Third, using specific gene variants that have been linked to autism, the research team will study genetic susceptibility to toxicity from chemical exposures in animals to help identify and confirm susceptibility genes in humans, and how these genes influence toxicity.

- **KC Donnelly Awards**
  - **Jill Riddell** is a Ph.D. candidate at West Virginia University working under Dorothy Vesper, Ph.D. She is also a trainee with the Northeastern University SRP Center, where she works on a project led by Ingrid Padilla, Ph.D., to learn how contaminants like solvents and pesticides are transported and stored in karst aquifers. Karst aquifers are unique because they are formed by water-soluble limestone and dolomite, which form channels as water slowly breaks down the rock. These channels and fractures in the rock make it easier for contaminants to move through the system. Riddell will travel to the University of Arizona SRP Center where she will work with Jon Chorover, Ph.D., a world-recognized soil chemist, to describe how a new tracing technique interacts with karst sediments.
  - **Nabil Shaikh** is a Ph.D. candidate at the University of New Mexico SRP Center, under the direction of Jose Cerrato, Ph.D. He is interested in strategies to clean up contaminants, such as uranium in water. Shaikh will travel to the Iowa SRP Center and work with Keri Hornbuckle, Ph.D. and Andres Martinez, Ph.D. He will learn a technique called electrospinning, which creates electrospun nanofiber mats (ENMs) with chemical characteristics that help them bind pollutants. He plans to test the ENMs for their ability to capture and remove uranium from contaminated water.
- **Jerry Schnoor, Ph.D.**, a University of Iowa SRP Center project leader, received the American Chemical Society (ACS) Award for Creative Advances in Environmental Science and Technology during the ACS Spring 2019 National Meeting, held March 31 - April 4 in Orlando, Florida. Schnoor has pioneered the science and practice of phytoremediation, which uses plants and microbes to reduce toxicants in the environment.
- University of Arizona SRP Center researcher **Monica Ramirez-Andreotta, Ph.D.**, assistant professor in the Department of Soil, Water, and Environmental Science at the University of Arizona (UA), received the 2019 Early Career Award for Public Engagement with Science presented by the American Association for the Advancement of Science (AAAS). Ramirez-Andreotta, who studies soil and food quality, was recognized for involving communities most affected by pollution, poor water quality, and food insecurity in the scientific process.
- UC San Diego SRP Center researcher **Ronald Evans, Ph.D.**, was named a 2018 AAAS Fellow. The AAAS acknowledged his discoveries on steroid and orphan receptor signaling, revealing a "treasure trove" of both known and novel branches of physiology, metabolism, and disease, according to the citation.
- Congratulations to University of Arizona College of Science Chemistry and Biochemistry alumna **Jani Ingram, Ph.D.,** who has been selected as the 2019 College of Science Alumna of the Year. Dr. Ingram earned her Ph.D. in Chemistry in 1990 under the mentorship of Dr. Jeanne Pemberton. Currently she is a Professor of Analytical and Environmental Chemistry at Northern Arizona University in Flagstaff.

- **Presidential Early Career Award for Scientists and Engineers:** The PECASE is the highest honor bestowed by the United States Government to outstanding scientists and engineers who are beginning their independent research careers and who show exceptional promise for leadership in science and technology.
    - **Kwanghun Chung, Ph.D.,** Associate Professor of chemical engineering, Massachusetts Institute of Technology
    - **Moriah Thomason, Ph.D.,** Assistant Professor at Wayne State University