Report to the National Advisory Environmental Health Sciences Council

Director, NIEHS

11-12 February 2020

Budget and Legislative Report

FISCAL YEAR 2020 APPROPRIATIONS UPDATE

FY2020 Appropriations for NIEHS Budget

After two continuing resolutions, on December 20, 2019, H.R. 1158 (consists of four FY 2020 spending bills – Defense, Homeland Security, Commerce-Justice-Science, and Financial Services) and H.R. 1865 (consists of eight spending bills: Agriculture, Energy-Water, Interior-Environment, Labor-HHS-Education, Leg Branch, Military Construction-VA, State-Foreign Operations, and Transportation-HUD) were signed into law by President Trump. The House passed HR 1865 by a vote of 297-120 and the Senate passed the measure by a vote of 71-23.

The agreement provides a funding increase of no less than 3 .3 percent above fiscal year 2019 to every Institute and Center at NIH, bringing the total funding for NIH to $41.7 billion, which is an increase of $2.6 billion (6.7%) over the FY2019 Omnibus amount.

The following table[1] details the final Fiscal Year (FY) 2020 appropriations that passed into law relevant to NIEHS and the initial marks proposed for 2020 by the Senate and the House compared to FY2019.

Budget Line	FY2019 Enacted Amount[2]	House FY2020 Bill		Senate FY2020 Bill[6]		FY2020 Appropriation	Δ - FY2020 Agreement vs FY2019 Enacted
		Proposed Amount	Δ vs FY2019	Proposed Amount	Δ vs FY2019		
NIEHS base budget[3]	$774.707	$812.570	+$37.863 +4.89%	$815.729	+$41.022 +5.29%	$802.598	$27.891[1] +3.6%
NIEHS Superfund-related activities[4]	$79.000	$80.000	+$1.000 +1.26%	$81.000	+$2.000 +2.53%	$81.000	+$2.000[2] +2.53%
DOE Transfer to NIEHS for Nuclear WTP[5]	$10.000	$0	($10.000)	$10.000	$0	$10.000	$0
NIEHS Total	$863.707	$892.570	+$38.863 +4.49%	$906.729	+$43.022 +4.98%	$893.598	$29.891 +3.46%

[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 bill that supports the DOE/NIEHS Nuclear Worker Training Program.

[6] On September 18, 2019, the Senate Appropriations Committee publicly released the draft text and accompanying committee report for the Senate version of the FY2020 Labor, Health and Human Services, Education, and Related Agencies Appropriations bill. The bill and committee report remain in draft form at this time.

Items to note for NIEHS for the Appropriations:

1. **HURRICANE HARVEY RESEARCH SET-ASIDE.** At least $3 million of the $27.891 million increase from the LHHS-appropriated portion of the NIEHS budget must be expended on "Hurricane Harvey Research." The operative language contained in the Joint Explanatory Statement (JES) accompanying the bill reads as follows:

   "*NIEHS Hurricane Harvey Research*.—The agreement includes $3,000,000 for the continued funding and expansion of research on the health effects of environmental exposures directly related to the consequences of Hurricane Harvey in 2017. The research should focus on the full Hurricane Harvey-affected region, conduct follow-up health research on affected populations on registrants, link to relevant government and non-profit intervention research programs, and provide critical information on disaster preparedness through data sharing and analysis." (Division A, pg. 63)

2. **SRP INCREASE.** The $2 million increase in appropriations for the NIEHS Superfund-related activities through the Interior and Environment Division is to be expended exclusively on the Superfund Research Program (SRP) with emphasis on PFAS research and other contaminants of emerging concern. The operative language contained in the JES accompanying the bill reads as follows:

   "*NIEHS*.—The agreement provides $81,000,000 for the National Institute of Environmental Health Sciences. The $2,000,000 increase above the enacted level is provided to help meet the demands of the Superfund Research Program and to support research on PFAS and other contaminants of emerging concern." (Division D, pg. 58)

FY2021 Appropriations Cycle

Transmittal of the President's FY2021 budget request—to include the NIH Congressional Budget Justifications (CJs)—to Congress is expected to be in February. As of this writing, no hearings of the House and Senate Appropriations Subcommittees to consider the FY2021 budget requests have been scheduled. Each year the NIH Director—accompanied by select Institute and Center Directors—is traditionally invited to testify on the NIH budget request before both the House and Senate Labor, Health and Human Services, Education, and Related Agencies Subcommittees. In the past as will happen this year, Statements for the Record from the NIEHS Director and all other Institute and Center Directors will be submitted to supplement the hearing testimony and CJs.

CONGRESSIONAL INTERACTIONS

E-Cigarettes and Vaping Research with House and Senate Labor-HHS Appropriations Committee Staff: Oct. 11th

On October 11, 2019, Dr. Fred Tyson, Health Scientist Administrator in the DERT Genes, Environment and Health Branch, participated in an approximately hour-long joint telephone conference with other NIH SMEs (namely from NHLBI, NIDA, and NCI) and the bipartisan, bicameral staff of the Appropriations Committees. The staff requested a comprehensive update about NIH research investigating health effects associated with e-cigarettes and vaping. There have been a number of recent Congressional hearings held

on this topic. Dr. Tyson summarized the relevant NIEHS research during this conference call, which was staffed by Dr. Sheila Newton as Bullock was on leave that day.

Children's Environmental Health Research Conf. Call with House Oversight Cmte. Staff: Oct. 18th

On October 18, 2019, Dr. Kimberly Gray, Health Scientist Administrator in the DERT Population Health Branch, spoke with Michael Castagnola, a staffer for the House Oversight and Reform Committee Chairman, about children's environmental health (CEH) research. The staffer wanted to obtain a better understanding of the NIEHS CEH research portfolio, particularly as it relates to particulate matter and health effects associated with air pollution. Dr. Gray thoroughly responded to each question asked on the spot and committed to send the staffers via OLPA a few follow-up paper citations and other public information about the research of interest to the staffer.

Friends of NIEHS Congressional Briefing Held on Children's Environmental Health: Sept. 24th

The Friends of NIEHS—led by co-chair Nuala Moore of the American Thoracic Society—sponsored a Congressional informational briefing on the subject of Children's Environmental Health (CEH) on Tuesday, September 24, 2019, in Room 902 of the Hart Senate Office Building. The office of Sen. Thom Tillis of North Carolina secured the room for this briefing. Dr. Birnbaum opened the briefing by providing an overview of the NIEHS CEH portfolio. Dr. Joseph M. Braun, Ph.D., Associate Professor, Department of Epidemiology, School of Public Health, Brown University, Providence, RI, followed with a presentation of his research about neurodevelopmental health effects for children exposed to low levels of PFAS. Dr. Nadia N. Hansel, M.D., Associate Dean for Research and Professor, School of Medicine, Johns Hopkins University, Baltimore, MD, was the third speaker who presented her research about air pollution and asthma. Over 70 Congressional staff and interested persons in the advocacy community attended this briefing.

FNIEHS Congressional Briefing on PFAS: Nov. 6th

On November 6th, 2019, the Friends of NIEHS (FNIEHS) sponsored a Congressional informational briefing (hosted by Congressman Dan Kildee of Michigan) for Congressional staff and other interested parties learn about research funded by the National Institute of Environmental Health Sciences (NIEHS) that helps understand the toxic properties of PFAS chemicals and potential adverse health effects due to PFAS exposure. The briefing was well attended, and the room was packed with about 100 people. Dr. Mark Miller (Chief of Staff, NIEHS) gave an overview of PFAS and the NIEHS research to date. Dr.Zeyan Liew (Assistant Professor of Epidemiology and Environmental Health, Yale University) spoke about adverse health impacts associated with developmental exposures to PFAS. And the last speaker, Dr. Abby Fleisch (Assistant Professor of Pediatrics, Tufts University School of Medicine) spoke about how PFASs impacts obesity and bone health.

Interior and Environment Appropriations Staffer visits NIEHS: Jan. 22nd

On January 22, 2020, Dr. Kusai Merchant, from the House Committee on Appropriations' Subcommittee on Interior and Environment and related agencies visited NIEHS's campus in NC. His Subcommittee is responsible for the funding related to NIEHS's Superfund Research Program and Worker Training Program appropriations. He was greeted by acting director, Dr. Rick Woychik, given a tour by NIEHS staff of intramural labs, and then met with Dr. Collman and NIEHS extramural staff to get an overview of the Superfund Research Program and the Worker Training Program's activities in FY19. He additionally met with Dr. Collman and extramural staff to discuss the previously funded NIEHS-EPA Children's Environmental Health Centers and current funding in the NIEHS Children's environmental health research portfolio.

ICCVAM and animal use in toxicity testing Conference Call with Rep. Calvert's Staff: Jan. 24th
On January 24, 2020, Dr. Warren Casey and Dr. Mary Wolfe met with Allyson McReynolds from Congressman Calvert's staff (CA-42) to give technical assistance for H.R. 249 the "*Federal Accountability in Chemical Testing Act*" or the "FACT" Act. The bill would require the biennial reports of 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.

ENVIRONMENTAL HEALTH RELATED LEGISLATION UPDATES

Bill to ban Asbestos (H.R. 1603) moves in the House
On November 19th, 2019, Alan Reinstein Ban Asbestos Now Act of 2019 (sponsored by Rep. Suzanne Bonamici (D-OR)) was marked up and passed out of the House Energy and Commerce Committee by a vote of 47-1. The bill aims to amend the Toxic Substances Control Act to prohibit the manufacture, processing, and distribution in commerce of asbestos and asbestos-containing mixtures and articles. The bill has been reported to the House floor and awaits further action. There is no indication if the Senate would take up the bill if passed by the House or look to move its own version (S. 717, introduced by Sen. Merkley (D-OR)).

H.R. 535, PFAS Action Act of 2019, passed in the House
PFAS Action Act of 2019 (Sponsor: Congresswoman Dingell (MI-D)) passed in the House on January 10, 2020 and now awaits action in the Senate. There was a manager's amendment from Congressman Pallone (D-NJ) striking areas of the bill that have already been enacted into law before the bill went to the floor. The bill requires EPA to designate within a year from the date of enactment certain PFAS as "hazardous substances" under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); requires clean-up of contaminated sites; and ensures the adoption of a drinking water standard for certain PFAS. The Administration came out with a Statement of Administration Policy (SAP) against the bill on January 7th. This bipartisan bill has 66 cosponsors in the House and an identical bill was introduced in the Senate (S. 638) by Senator Thomas Carper (52 bipartisan cosponsors in the Senate).

National Defense Authorization Act of FY2020 (S.1790) signed into law
S. 1790, the National Defense Authorization Act of FY2020 (Sponsor: Sen. Jim Inhofe (R-OK)) was signed into law on Dec. 20, 2019. PFAS/PFOS/AFFF provisions: The agreement would bar the use of funds, after Oct. 1, 2023, to procure firefighting foam that contains PFAS/PFOS in excess of one part per billion (The use of firefighting foam in ocean-going vessels would be exempt from the funding restriction).The Navy would have to ensure a fluorine-free firefighting agent is available at all military installations by that date. The agreement also would bar the use of fluorinated aqueous film-forming foam (AFFF), used for fire suppression, at all military bases beginning Oct. 1, 2024, or earlier if possible. Additionally, the measure also would direct DOD to prohibit: 1.) The uncontrolled release of fluorinated AFFF at military bases, but AFFF could be used for an emergency response or for equipment testing or personnel training, if appropriate disposal mechanisms are in place to prevent release into the environment; 2.) The use of fluorinated AFFF for training exercises at military bases; and 3.) PFAS-containing food contact substances that are used to assemble and package meals ready-to-eat by Oct. 1, 2021. Furthermore, the bill states that DOD is required, upon request, to finalize or update an agreement with a state to monitor and

remove PFAS contamination related to DOD activities. Under the Act, the Environmental Protection Agency (EPA) would be required to include PFAS on the list of unregulated contaminants to be monitored by public water systems. EPA would have to require public water systems to monitor for PFAS. The monitoring requirement could be waived for water systems serving less than 10,000 persons if they don't have sufficient lab capacity, though EPA would have to cover the "reasonable cost" of testing for those systems.

ENVIRONMENTAL HEALTH RELATED CONGRESSIONAL HEARINGS

House Committee on Science, Space and Technology Hearing on STRENGTHENING TRANSPARENCY OR SILENCING SCIENCE? THE FUTURE OF SCIENCE IN EPA RULEMAKING. On November 13th, 2019, the House Committee on Science, Space and Technology held a hearing on the EPA's April 30, 2018 proposed rule "Strengthening Transparency in Regulatory Science" and the forthcoming supplemental proposed rule (expected early 2020) that will provide clarifications on certain terms and aspects of the proposed rule released on April 2018. Witnesses included: Dr. Jennifer Orme-Zavaleta, Principal Deputy Assistant Administrator for Science, EPA Office of Research and Development (ORD); EPA Science Advisor; Dr. Linda S. Birnbaum, Former Director, National Institute of Environmental Health Sciences (NIEHS) 2009-2019; Dr. Mary B. Rice, Assistant Professor of Medicine, Harvard Medical School; Pulmonary and Critical Care Physician, Beth Israel Deaconess Medical Center; Dr. David Allison, Dean, School of Public Health, Indiana University-Bloomington; Member, "Reproducibility and Replicability in Science" Committee, The National Academies of Sciences, Engineering, and Medicine; Dr. Brian Nosek, Co-Founder and Executive Director, Center for Open Science; and Dr. Todd Sherer, CEO, The Michael J. Fox Foundation for Parkinson's Research.

House Oversight and Government Reform Subcommittee Hearing on Talc and Asbestos
On Dec. 10th, 2019, House Oversight and Government Reform Subcommittee on Economic and Consumer Policy held a hearing entitled "Examining Carcinogens in Talc and the Best Methods for Asbestos Detection." The hearing determined to examine health risks related to use of talcum powders containing asbestos, and detection methods used to help inform public health. The hearing stemmed from the recent recall of baby powder by Johnson & Johnson when asbestos was found in one batch of its product by FDA. The hearing shed light on documents as early as the 1970s indicating there was a possibility the asbestos could be in the talcum powder product by Johnson & Johnson. The CEO from Johnson & Johnson declined to testify, but a panel of experts and one patient did testify in the hearing. Witness included: Dr. William Longo (Scientist, Materials Analytical Services, LLC), Dr. Rod Metcalf (Geologist, University of Nevada-Las Vegas), Dr. Jacqueline Moline (Physician, Feinstein Institutes for Medical Research at Northwell Health), Mr. David Etheridge (Patient). Dr. Largo spoke about various detection methods and approaches used by companies, independent testing facilities, and the FDA with a wide-range of sensitivities in detection. He claimed his testes of Johnson & Johnson talcum powder from 1940s-2000s, about discovered 65% of all samples tested positive for asbestos using the Heavy Liquid Separation testing method. Dr. Metcalf spoke about how "the probability that talc and amphibole asbestos coexist in talc-rich rocks is very high." Dr. Moline testified about 33 patients of that developed mesothelioma and the only common link of potential exposure to asbestos was talcum powder. She stated that there is no safe level of asbestos in talcum powder or any other product.

Science Advances

One NIEHS [NIEHS authors]

- ***Hair dye and chemical straightener use and breast cancer risk in a large US population of black and white women.*** *Eberle CE, DP Sandler [DIR], KW Taylor [DNTP] and AJ White [DIR]. International Journal of Cancer* (2019) [ePub]
  https://doi.org/10.1002/ijc.32738
  Th.2 Goal 4

DNTP

- ***Evaluating sufficient similarity of botanical dietary supplements: combining chemical and in vitro biological data****. Ryan KR, Huang MC, Ferguson SS, Waidyanatha S, Ramaiahgari S, Rice JR, Dunlap PE, Auerbach SS, Mutlu E, Cristy T, Peirfelice J, DeVito MJ, Smith-Roe SL, Rider CV. Toxicol Sci;* 172 (2), 316-329 2019 Dec 1.
  https://pubmed.ncbi.nlm.nih.gov/31504990/
  Th. 1 Goal 5, 6; Th.2 Goal 1, 2, 5

DIR

- ***Cryo-EM reveals active site coordination within a multienzyme pre-rRNA processing complex****. Pillon MC, AL Hsu, JM Krahn, JG Williams, KH Goslen, M Sobhany, MJ Borgnia and RE Stanley. Nature Structural & Molecular Biology* (2019) v. 26 (9): pp. 830-839
  https://doi.org/10.1038/s41594-019-0289-8
  Th. 1, Goal 1; Th. 3, Goal 1, 3, 5

- ***p53-responsive TLR8 SNP enhances human innate immune response to respiratory syncytial virus.*** *Menendez D [DIR], J Snipe [DIR], J Marzec [DIR], CL Innes [DIR], FP Polack, MT Caballero, SH Schurman [DIR], SR Kleeberger [DIR] and MA Resnick [DIR]. Journal of Clinical Investigation* (2019) v. 129 (11): pp. 4875-4884
  https://doi.org/10.1172/jci128626
  Th. 1, Goal 1, 2; Th. 3, Goal 1, 3, 5

- ***Novel role for mineralocorticoid receptors in control of a neuronal phenotype.*** *McCann KE [DIR], DJ Lustberg [DIR], EK Shaughnessy [DIR], KE Carstens [DIR], S Farris [DIR], GM Alexander [DIR], D Radzicki [DIR], M Zhao [DIR] and SM Dudek [DIR]. Mol Psychiatry* (2019).
  https://doi.org/10.1038/s41380-019-0598-7
  Th. 1, Goal 1; Th. 3, Goal 1, 5

- ***RUNX1 maintains the identity of the fetal ovary through an interplay with FOXL2.*** *Nicol B [DIR], SA Grimm [DIR], F Chalmel, E Lecluze, M Pannetier, E Pailhoux, E Dupin-De-Beyssat, Y Guiguen, B Capel and HH Yao [DIR]. Nat Commun* (2019) v. 10 [ePub]
  https://doi.org/10.1038/s41467-019-13060-1
  Th. 1, Goal 1; Th. 3, Goal 1, 3

- ***Two-tiered enforcement of high-fidelity DNA ligation.*** *Tumbale PP [DIR], TJ Jurkiw, MJ Schellenberg [DIR], AA Riccio [DIR], PJ O'Brien and RS Williams [DIR]. Nat Commun* (2019) v. 10 [ePub]
  https://doi.org/10.1038/s41467-019-13478-7
  Th. 1, Goal 1; Th. 3, Goal 1, 3

- ***Non-canonical autophagy in dermal dendritic cells mediates immunosuppressive effects of UV exposure***. Sil P [DIR], J Suwanpradid, G Muse [DIR], A Gruzdev [DIR], L Liu [DIR], DL Corcoran, CJ Willson, K Janardhan, S Grimm [DIR], P Myers [DIR], LM Degraff [DIR], AS MacLeod and J Martinez [DIR]. *The Journal of allergy and clinical immunology* (2019).
  https://doi.org/10.1016/j.jaci.2019.11.041
  Th. 1, Goal 1; Th. 3, Goal 1, 3

DERT

- ***Particulate Matter and Episodic Memory Decline Mediated by Early Neuroanatomic Biomarkers of Alzheimer's Disease***. *Diana Younan, Andrew J Petkus, Keith F Widaman, Xinhui Wang, Ramon Casanova, Mark A Espeland, Margaret Gatz, Victor W Henderson, JoAnn E Manson, Stephen R Rapp, Bonnie C Sachs, Marc L Serre, Sarah A Gaussoin, Ryan Barnard, Santiago Saldana, William Vizuete, Daniel P Beavers, Joel A Salinas, Helena C Chui, Susan M Resnick, Sally A Shumaker, Jiu-Chiuan Chen.* Brain, 143 (1), 289-302. 2020 Jan 1.
  https://pubmed.ncbi.nlm.nih.gov/31746986/
  Th.1 Goal 2, 7; Th.2 Goal 3, 4

- ***Developmental Toxicity Assessment of Piperonyl Butoxide Exposure Targeting Sonic Hedgehog Signaling and Forebrain and Face Morphogenesis in the Mouse: An in Vitro and in Vivo Study.*** *Joshua L Everson, Miranda R Sun, Dustin M Fink, Galen W Heyne, Cal G Melberg, Kia F Nelson, Padydeh Doroodchi, Lydia J Colopy, Caden M Ulschmid, Alexander A Martin, Matthew T McLaughlin, Robert J Lipinski.* Environ Health Perspect, 127 (10), 107006. Oct 2019.
  https://ehp.niehs.nih.gov/doi/10.1289/EHP5260
  Th.1 Goal 1, 2

- ***Prediction and Associations of Preterm Birth and Its Subtypes With Eicosanoid Enzymatic Pathways and Inflammatory Markers.*** Max T Aung*, Youfei Yu,* Kelly K Ferguson*,* David E Cantonwine*, Lixia Zeng,* Thomas F McElrath*,* Subramaniam Pennathur*, Bhramar Mukherjee,* John D Meeker. Sci Rep*, 9 (1), 17049 2019 Nov 19.*
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6863859/
  Th.1 Goal 1, 6, 7; Th.2 Goal 5

- ***Diverse Tumour Susceptibility in Collaborative Cross Mice: Identification of a New Mouse Model for Human Gastric Tumourigenesis***. *Pin Wang, Yunshan Wang, Sasha A Langley, Yan-Xia Zhou, Kuang-Yu Jen, Qi Sun, Colin Brislawn, Carolina M Rojas, Kimberly L Wahl, Ting Wang, Xiangshan Fan, Janet K Jansson, Susan E Celniker, Xiaoping Zou, David W Threadgill, Antoine M Snijders, Jian-Hua Mao. Gut, 68 (11), 1942-1952 Nov 2019.*
  https://pubmed.ncbi.nlm.nih.gov/30842212/
  Th.1 Goal 1

- ***Health Effects Associated With Electronic Cigarette Use: Automated Mining of Online Forums.*** *Hua M, Sadah S, Hristidis V, Talbot P. J Med Internet Res 2020;22(1):e15684. 2020 Jan 3*
  https://www.jmir.org/2020/1/e15684/
  Th.1 Goal 7; Th.2 Goal 1, 5

- ***El Niño-Southern Oscillation and under-5 Diarrhea in Botswana.*** *Alexandra K Heaney, Jeffrey Shaman, Kathleen A Alexander. Nat Commun, 10 (1), 5798 2019 Dec 20.*
  https://www.nature.com/articles/s41467-019-13584-6
  Th.1 Goal 7; Th.2 Goal 1, 3, 5; Th.3 Goal 1, 4

NIEHS News and Highlights

Staffing updates

- **Elizabeth Gjoneska, Ph.D.** joined NIEHS on October 27 as a Tenure-Track Investigator with a primary appointment in Neurobiology Laboratory (NL) and a secondary appointment in the Epigenetics and Stem Cell Biology Laboratory (ESCBL). Dr. Gjoneska received her Ph.D. in Chromatin Biology and Epigenetics from the Rockefeller University working with Dr. David Allis and comes to NIEHS from MIT, where she was a postdoctoral scientist at the Picower Institute for Learning and Memory in the laboratory of Dr. Li-Huei Tsai. At MIT, Dr. Gjoneska led an effort to characterize mechanisms underlying gene expression changes during neurodegeneration resulting in identification of noncoding regulatory regions and key transcriptional regulators relevant to Alzheimer's disease (AD). Her work provided important insights into the molecular mechanisms of AD, demonstrating that genetic predisposition to the disease is encoded in the brain's immune function. At NIEHS, Dr. Gjoneska's group will continue to leverage expertise in chromatin and neurobiology to focus on the mechanisms that regulate the function of microglia, the resident immune cells of the brain, and how they malfunction during AD. Dr. Gjoneska's interdisciplinary research will complement the ongoing work in NL and ESCBL, as well as IIDL and the broader research community at NIEHS.

- **Anant Parekh, D. Phil., F.R.S.** joined NIEHS on December 8, 2019 as a Senior Investigator and Deputy Chief of the Signal Transduction Laboratory (STL). Dr. Parekh studied medicine at the University of Oxford, where he stayed on for his D.Phil. in the Department of Pharmacology. After postdoctoral studies at the Max Planck Institute for Biophysical Chemistry in Goettingen Germany with Nobel Laureate Erwin Neher and Reinhold Penner, he returned to Oxford where held a faculty position in the Department of Physiology, Anatomy and Genetics and subsequently became Professor of Physiology, Director of the Centre of Integrative Physiology and Fellow of Merton College. Dr. Parekh investigates how cells communicate with one another, with an emphasis on how the ubiquitous intracellular signaling messenger calcium controls biological functions such as secretion, energy production and gene expression. He is interested in how aberrant calcium signals can contribute to disease in humans, particularly allergies and asthma. Using various cell model systems and human tissues, he studies the physiology, cell biology and biochemistry of store-operated calcium channel proteins. Opening of these channels leads to calcium entry into the cell from the blood, triggering important physiological responses. Too much or too little calcium entry can lead to tissue damage and another research interest of Anant's is the development of drugs that target calcium channels for therapeutic use.

- **Patricia Jensen, Ph.D.** was awarded tenure by the NIH Central Tenure Committee and promoted to Senior Investigator in the Neurobiology Laboratory. Jensen received her Ph.D. in anatomy and neurobiology at The University of Tennessee Health Science Center in 2002, working in the laboratory of Dan Goldowitz, Ph.D. As a doctoral student, she focused on the cellular and molecular interactions underlying cerebellar morphogenesis. During her postdoctoral training in the laboratory of Tom Curran, Ph.D., at St. Jude Children's Research Hospital, Jensen managed the high-throughput in *situ hybridization* screen as part of the GENSAT project. In 2005, she joined the laboratory of Susan Dymecki, M.D., Ph.D., at Harvard Medical School as a postdoctoral fellow where she carried out molecular and genetic studies focusing on the embryonic and molecular development of individual serotonergic (5-HT) neuron subtypes. Jensen was recruited to the NIEHS in 2009.

- **Joel Kaufman, M.D., M.P.H.,** has been named the new Editor-in-Chief of Environmental Health Perspectives (EHP). He will assume the new role on February 1, 2020, upon retirement of the current editor, Sally Darney, Ph.D. Dr. Kaufman is a Professor of Environmental and Occupational Health Sciences, Medicine, and Epidemiology at the University of Washington, where he has served as Interim Dean for the School of Public Health. Dr. Kaufman will provide strategic leadership to EHP while continuing his work at the University of Washington. The arrangement reflects a recent change to the leadership structure at EHP that enables the Editor-in-Chief to continue conducting research and teaching at their home institution.

Spotlight on NIEHS: Data Science

Overview

The Office of Environmental Science Cyberinfrastructure (OESC) is responsible for planning and development of Informatics and Information Technology (I&IT) strategy at NIEHS, and in doing so, strives to provide innovative, secure, and reliable cyberinfrastructure that advances environmental health science and promotes healthier lives. OESC directly oversees the Office of Information Technology (OIT) and the IT Project Management Office (PMO) and governs and guides I&IT-related activities with the offices of Data Science (ODS), Scientific Computing (OSC), and Communication & Public Liaison (OCPL). Through formal governing bodies, OESC provides leadership and oversight to these groups. These relationships provide the frameworks for coordination and collaboration that advance NIEHS I&IT strategic goals including a forum for prioritization of data science projects, initiatives, and innovation.

Recent advances in the field of data science provide opportunities to more effectively derive insight from environmental health data sources, however, fully capitalizing on these developments presents numerous challenges. These include implementing secure and robust solutions for data storage and sharing, new more efficient computational infrastructure designs, filling gaps in data-centric methods and technologies through targeted hiring, as well as enhanced scientific and technical staff training. OESC's response to these challenges is guided by the NIH Strategic Plan for Data Science, which defines strategic objectives that, when met, will ensure data are *FAIR* – Findable, Accessible, Interoperable, and Reusable. Additionally, the NIEHS I&IT Strategic Roadmap articulates goals and strategic priorities that directly address Data and Knowledge Management, Clinical I&IT, and IT systems infrastructure that help define data science priorities and strategy. The roadmap further introduces the goal that data should be computable in-place, extending *FAIR* principles to *FAIR+*. NIEHS must further exercise comprehensive stewardship to ensure IT security and data privacy and that resources are allocated in a manner that

maximizes public benefit. To this end, NIEHS continues to work on enhancing the data science workforce within our intramural programs and across the environmental sciences research community. We are building modern data ecosystems that support diverse sharing, reuse, and integration of biomedical and environmental health data.

Current Efforts

Efforts are underway within OESC and the offices within its purview to implement the goals and strategic priorities outlined above. Currently, NIEHS intramural researchers have access to a large central storage platform with low latency connections to all major scientific computing servers, and a robust backup system to ensure data integrity. NIEHS maintains a comprehensive suite of analytical tools on this platform and provides access to new software required by researchers upon request. NIEHS also maintains servers that include graphics processing unit (GPU) hardware, which can substantially accelerate image-based and machine learning tasks, as well as other more traditional analyses. Under the NIH STRIDES program, pilot projects are underway to explore cloud computing and cloud-based storage technologies to enhance collaboration with extramural researchers and augment on-premise capabilities. The NIEHS ODS has also been developing an information commons environment that will provide an interface to query metadata associated with data sets and knowledge bases. This system may be extended in the future to allow in-place computation of data, further delivering on FAIR+ principles. NIEHS teams are also working to develop interoperable laboratory information management systems (LIMS) that will ensure data are generated and processed using standardized workflows, and that appropriate metadata is collected and catalogued at all stages. Full implementation of these LIMS and widespread adoption of the information commons environment will encourage use of standardized formats, analysis workflows, and metadata vocabularies, facilitating the deposition of data sets to public repositories and increasing the utility of data across the environmental health research community. NIEHS is additionally prioritizing training post-doctoral and post-baccalaureate fellows. As their careers progress, these researchers will remain mindful of FAIR+ principles and the solutions developed for their implementation. Finally, to safeguard the long-term integrity of data storage, LIMS, and the overall information commons environment, NIEHS is developing and implementing holistic governance policies related to data lifecycle, sharing, and retention, backup procedures, and controlled access to PII/PHI or other sensitive data.

The NIEHS works to align its efforts in data science with those of other NIH ICs, such as efforts across NIH ICs to standardize on approaches for handling cross-institutional authentication and authorization as well as adopting containerization technology to promote reusable data processing pipelines. However, the nature of environmental health science research at NIEHS often favors different priorities for data science investments. Environmental health research encompasses a spectrum of diverse data types that include biomolecular, clinical, population, geophysical, social, environmental, and exposure data. This brings up unique challenges for integrating across data types and model systems. In response, NIEHS is promoting efforts to increase annotation of valuable data sets and increase development of environmental and exposure-related ontologies, metadata, and standardized terminologies, each of which is critical in facilitating data interoperability. NIEHS is also focusing increased effort at developing new data-driven methods to mine existing knowledge (e.g., use of natural language processing to automate data extraction) and to improve prediction of exposure impacts through targeted data collection efforts in order to rapidly understand the threat of emerging

environmental health concerns. Increasingly, NIEHS is incorporating these goals into data collection efforts to ensure investment in data curation is guided by research goals.

Future Plans

Future initiatives will focus on augmenting existing systems to promote data sharing and interoperability with NIEHS-funded projects and implementing solutions to support long-term management and curation of such data. Systems will prioritize enhanced integration of intramural, trans-NIH, and extramural sources that combine clinical, genomics, and environmental exposure data sets. The use of AI and machine learning based approaches will continue to increase, to support data analysis as well as supporting greater automation in extracting and processing valuable information from unstructured and semi-structured data in support of research goals. These systems will require active security procedures to protect PII/PHI while providing access to approved researchers in accordance with subject consent. Interfaces will provide secure audiovisual communication and exchange of medical records between intramural researchers, external clinicians and investigators, and research subjects themselves. Further processes and policies must be developed for the oversight of data and knowledge management activities and investments to sustain their utility long-term.

OESC is actively working to streamline data science initiatives that realize the goals and objectives outlined in the NIH Strategic Plan for Data Science and NIEHS I&IT Strategic Roadmap. These efforts are focused on anticipating and meeting the needs of extramural and intramural environmental health science researchers and are performed in service of the translational research ideal: transforming data to knowledge to action.

Meetings and Events

Past Events

- **Environmental Mutagenesis and Genomics Society 50th Annual Meeting:** NIEHS co-sponsored the EMGS 50th Annual meeting held in Washington, D.C. September 19-23, 2019. NIH Distinguished investigator and head of the NIEHS DNA Replication Fidelity Group Thomas Kunkel was a keynote speaker. Other scientists from NIEHS chaired sessions and gave talks. The meeting brought together leading scientists from academia, industry, and government to discuss cutting-edge research aimed at understanding and mitigating environmental threats to the genome and to the epigenome. The scientific program consisted of symposia, platform and poster sessions, including rapid "flash" talks of abstracts, workshops, and internationally recognized speakers. In addition to the scientific program, the meeting convened the nine Special Interest Groups (SIGs) that represent the diversity of the Society and celebrated the society's 50th Annual Meeting.
  Th. 1: Goal 1; Th. 2: Goal 2, 5; Th. 3: Goal 3

- **Identifying Opportunities to Understand, Control, and Prevent Exposure to PFAS: A Workshop of the Environmental Health Matters Initiative:** Experts and concerned citizens gathered Sept. 26-27 in Washington, D.C., to discuss the class of chemicals known as PFAS, or per- and polyfluoralkyl substances. The workshop was the first organized by the Environmental Health Matters Initiative (EHMI), an ambitious effort by the National Academies of Science, Engineering, and Medicine (NASEM). Topics ranged from balancing risk and alternatives assessments to economics and sharing information with affected communities. Thomas Burke,

Ph.D., of Johns Hopkins University, and Linda Birnbaum, Ph.D., now head of the National Toxicology Program (NTP) Toxicokinetics and Toxicology Laboratory, have been among the chief architects of EHMI since it began over two years ago. They and other scientific leaders designed the initiative as a new way to explore innovative solutions to the nation's most pressing environmental health challenges, such as PFAS.
Th. 2: Goal 2, 5; Th. 3: Goal 3, 6

- **Triangle Global Health Consortium Annual Conference:** Roughly 330 scientists, policy experts, biotechnology leaders, and college students attended the Triangle Global Health Annual Conference Oct. 16, co-sponsored by NIEHS. The meeting, held in Durham, North Carolina, focused on One Health — the idea that human, animal, and environmental health are interconnected. The Triangle Global Health Consortium, which partners with nearby researchers, companies, nonprofits, and government entities to improve health worldwide, hosted the event. During her keynote address, NIEHS Scientist Emeritus Linda Birnbaum, Ph.D., emphasized the importance of studying the natural world through a One Health lens. For example, health effects in animals can provide insight into potential effects in humans.
Th. 2: Goal 2, 3, 6; Th. 3: Goal 4

- **Reproductive Epidemiology – Past, Present, and Future:** NIEHS, October 18 During this day-long symposium, held October 18 at NIEHS, prominent senior researchers in reproductive and perinatal epidemiology (from NIEHS and universities in the US and abroad) addressed the broad issues of progress in reproductive and perinatal epidemiology over the past 40 years and suggested unresolved questions and future challenges. Synthesizing both current and past research findings will provide an evidence base to inform future research, policy decisions, and prevention strategies.
Th. 1: Goal 1; Th. 2: Goal 1, 3

- **Research Triangle Environmental Health Collaborative 12 Annual Environmental Health Summit – PFAS: Integrating Science and Solutions in NC:** Toxicologists, policy analysts, industry and community representatives, and North Carolina state legislators met Oct. 23-24 in Durham for a summit on per- and polyfluoroalkyl substances (PFAS). Those man-made chemicals exist in many products, such as nonstick cookware and firefighting foam. The meeting highlighted work from the testing network, a research partnership that includes NIEHS grantees. It was formed after the Cape Fear River, the water source for Wilmington, was found contaminated with a type of PFAS called GenX in 2017. State lawmakers provided funding for university scientists to measure the chemicals' concentrations in water and air samples across North Carolina, analyze potential health effects, and develop treatment solutions.
Th. 2: Goal 2, 3, 6; Th. 3: Goal 3

- **Workshop on Tissue Chip Platforms as Tools for Testing Biocompatibility and Biotoxicity of Biomaterials:** NIEHS along with the National Institute of Dental and Craniofacial Research; National Heart, Lung, and Blood Institute; and National Institute of Arthritis and Musculoskeletal and Skin Diseases sponsored the workshop on October 24-25 in Washington, D.C. The workshop was designed to guide research directions that take advantage of human Tissue Chip platforms

for assessing biocompatibility, immunogenicity, and biotoxicity of biomaterials for research and clinical application in tissue engineering, regenerative medicine, oncology, dentistry, cardiology, drug screening, and other areas. Among the priority discussion topics were the design and validation of Tissue Chip platforms for assessing biomaterial properties, and application of Tissue Chip platforms in predicting *in vivo* responses of tissues and organs to biomaterials.
Th. 1: Goal 1, 7; Th. 2: Goal 1; Th. 3, Goal 3

- **Genetics and Environmental Mutagenesis Society Fall Meeting**: Biological factors that can lead to cancer were the focus of the fall meeting of the Genetics and Environmental Mutagenesis Society (GEMS), held Oct. 30. Local scientists, trainees, and students met at the North Carolina Biotechnology Center in Durham. Speakers discussed genotoxic and nongenotoxic mechanisms that may result in cancer. An agent is considered genotoxic if it damages or mutates DNA, but much discussion centered on nongenotoxic agents. Meeting organizer Arun Pandiri, B.V.Sc. & A.H., Ph.D., a pathologist in the National Toxicology Program (NTP), focused the meeting on substances that activate various nuclear receptors, including estrogen receptor, constitutive androstane receptor, and peroxisome proliferator-activated receptor. The conference also featured poster presentations and talks by area trainees. Scientists exchanged ideas about a variety of topics, such as cancer risk assessment.
  Th. 1: Goal 1; Th. 2: Goal 3; Th. 3: Goal 1, 3

- **American Public Health Association Annual Meeting and Expo:** The work of NIEHS staff members and grant recipients was showcased at the American Public Health Association's annual meeting. Nearly 13,000 public health professionals gathered at the Philadelphia Convention Center Nov. 2-6 for the American Public Health Association's (APHA) Annual Meeting and Expo. NIEHS staff members and recipients of NIEHS research grants hosted presentations on topics ranging from climate and human health to science communication. At a session organized by NIEHS, authors of major reports on climate change and human health discussed how their findings could be used at the community level to reduce health disparities. Liam O'Fallon, program director for NIEHS Partnerships for Environmental Public Health, moderated a session on making environmental health research accessible to wider audiences. As in previous years, NIEHS showcased educational resources at its exhibit booth. Staffers were on hand to discuss such topics as career opportunities and children's health.
  Th. 2: Goal 2, 4, 6; Th. 3: Goal 1, 2, 3, 4

- **17th Annual NIEHS Science Days:** On Nov. 7, NIEHS postdoctoral, predoctoral, and postbaccalaureate fellows gave oral presentations as part of the institute's 17th Annual Science Days. The two-day event celebrates the work of trainees and helps them share research with colleagues and potential collaborators. Scientists from universities across North Carolina visited EPA to listen to trainees and join NIEHS principal investigators and staff in judging the Best Oral Presentation contest. The second day of the 17th Annual NIEHS Science Days, held Nov. 8, continued the institute's celebration of its trainees' scientific achievements. It featured 87 poster presentations by postdoctoral, predoctoral, and postbaccalaureate research fellows. There also was a workshop about the grant application process, aimed at helping fellows advance in their careers.

Th. 1: Goal 1; Th. 3: Goal 1, 2, 3

- **BCERP Annual Meeting:** The 14th BCERP Annual Meeting: Bringing Precision to the Future of Environmental Breast Cancer Research, took place on November 7-8, 2019, in Atlanta, GA. This annual BCERP conference incorporated the complementary perspectives of basic science, population science and community engagement with a focus on empowering individuals and tackling the hurdles that remain. On Thursday, November 8th, 2019, the day ended with a summary of the accomplishments of the BCERP, as well as some future directions. Panelists included Gwen Collman, Caroline Dilworth, Gary Ellison, Shuk-Mei Ho, Karen Miller, Les Reinlib, and Susan Teitelbaum.
  Th. 1: Goal 1, 5; Th. 2: Goal 2; Th. 3: Goal 3

- **2019 SRP Annual Meeting:** On the last day of the 2019 NIEHS Superfund Research Program (SRP) Annual Meeting, held Nov. 18-20 in Seattle, participants were offered a boat tour of the Duwamish River. Organized by meeting hosts from the University of Washington (UW) SRP Center, the tour spotlighted the history of the Lower Duwamish Waterway Superfund Site and the community groups that have worked to protect the river as a cultural resource. The tour was hosted by James Rasmussen, a member of the Duwamish Tribe and Superfund manager of the Duwamish River Cleanup Coalition (DRCC), along with Shawn Blocker of the U.S. Environmental Protection Agency (EPA) Region 10. Blocker described the vast cleanup efforts carried out since 2001, when the area was designated a Superfund site. Clean up continues, with the help of community groups like the DRCC. Dredging and capping are two of the approaches that parties responsible for the contamination use to reduce human exposure to polychlorinated biphenyls (PCBs) and other harmful chemicals in the sediment. PCBs are classified as human carcinogens and have been banned from the United States since 1979. However, like other persistent chemicals, they remain in water, soil, sediment, and in animals and plants.
  Th. 1: Goal 4, 5; Th. 2: Goal: 2, 3, 4, 5; Th. 3: Goal 1, 3

- **Triangle Area Cryo-EM Symposium:** NIEHS, Duke University, and the University of North Carolina at Chapel Hill (UNC) joined forces in 2017 with the launch of the Molecular Microscopy Consortium (MMC). The goal: to support scientific research by providing training on, and access to, cryogenic electron microscopy, or cryo-EM. During the first Triangle Area Cryo-EM Symposium, held Dec. 16-17 in Research Triangle Park, group members celebrated their recent collaborative successes. At the meeting, 27 speakers — most of whom are part of the consortium — presented their cryo-EM work to more than 100 attendees. Cryo-EM shows the shape of biomolecular complexes, which are made of multiple molecules of protein, DNA, RNA, lipids, or carbohydrates, and combinations thereof. The method has revolutionized structural biology, which traditionally relied on X-ray crystallography, and increasingly is used in environmental health research.
  Th. 1: Goal 1; Th. 2, Goal 2; Th. 3: Goal 3

- **ESEHD Emerging Technologies to Advance Research and Decisions on the Environmental Health Effects of Microplastics:** Washington DC, January 27-28, 2020 This workshop, held January 27-28 at the National Academies Sciences, Engineering and Medicine in Washington, D.C., brought together the environmental science and health communities to explore how

emerging technologies and research strategies could help address important environmental health questions about microplastics. Participants explored methods to detect and quantify microplastics in food and the environment, delved into research on the effects of microplastics on the health of humans and wildlife, and discussed ways to reduce microplastics in the environment. The workshop ended with a session on how these new approaches may be leveraged to inform public health and policy questions. The workshop was sponsored by NIEHS. **Th. 2: Goal 2, 3, 6; Th. 3: Goal 3**

Upcoming Events

- **PEPH Annual Meeting,** NIEHS, February 12-14, 2020
- **Music and Science Lunch, Listen, and Learn,** RTP, February 18
- **From PBB to PFAS: research and Action to Address Michigan's Large-Scale Chemical Contaminations**, Ann Arbor MI, February 20
- **SOT 59th Annual Meeting and ToxExpo,** Anaheim CA, March 15-19
- **Spring 2020 NIEHS WTP Awardee Meeting and Workshop,** Atlanta GA, March 16-18, 2020
- **Estrogen Receptor Hormone Action Symposium,** NIEHS, March 20, 2020
- **20202 Northeast SRP Meeting,** Providence RI, March 26-27
- **6th Annual Women's Health Awareness Day,** Durham NC, April 4, 2020
- **ESEHD Integrating the Science of Aging and Environmental Health Research,** Washington DC, April 6-7
- **2020 Toxicology and Risk Assessment Conference,** Cincinnati OH, April 20-23
- **SETAC Focus Topic Meeting: Nontarget Analysis for Environmental Risk Assessment,** Durham NC, May 26-30
- **ESEHD Translatable and Accessible Biomarkers of Effect: From Model Systems to Humans,** Washington DC, June 1-2
- **NIEHS Global Environmental Health Day 2020,** NIEHS, June 4
- **ESEHD Workshop on Predicting Human Health Effects from Environmental Exposures: Applying Translatable and Accessible Biomarkers of Effect,** Washington DC, June 9-10

Awards and Recognition

NIEHS

- **Dr. Linda Birnbaum, Ph.D., D.A.B.T., A.T.S**, has earned the distinction of **Scientist Emeritus** by unanimous vote of the NIH Board of Scientific Directors. Dr. Birnbaum retired as Director of the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP) on October 3, 2019. Now, as Scientist Emeritus and Special Volunteer to NIEHS, she will conduct research and serve as the Principal Investigator for the DNTP Laboratory of Toxicokinetics and Toxicology (LTT).

- **Trevor Archer, Ph.D.,** received the honorific title of NIH Distinguished Investigator. He is chief of the NIEHS Epigenetics and Stem Cell Biology Laboratory (ESCBL) and head of the Chromatin and Gene Expression Group.

- **Stella Sieber** was selected for the "Cultivating Inclusion: Honoring NIH Champions and Allies of Disability" award, sponsored by the NIH Office of Equity, Diversity, and Inclusion. This is the first year for the award, and the selection committee could not have picked a more deserving

candidate. Stella, a biologist in DIR, is being recognized for her countless contributions as an advocate for the limb loss/limb difference (LL/LD) community.

- **AAAS Fellow: Francisco DeMayo, Ph.D.,** was among the 443 scientists elected by their peers to the distinguished group. He leads the NIEHS Reproductive and Developmental Biology Laboratory (RDBL) and the Pregnancy and Female Reproduction Group within that lab. DeMayo studies molecular mechanisms that regulate the female reproductive system and the lungs, as well as how environmental factors contribute to diseases like endometriosis, endometrial cancer, and lung cancer.

- An international group led by NIEHS clinical researchers was recognized as a Champion of Hope for its work on myositis, a rare autoimmune disease. The International Myositis Assessment and Clinical Studies Group (IMACS) was one of nine individuals or organizations recognized for having a positive impact on people who study or are affected by rare diseases. The 2019 award recipients were honored at a dinner Sept. 20 following the 8th Annual Global Genes RARE Patient Advocacy Summit in San Diego. **Lisa Rider, M.D.,** and **Frederick Miller, M.D., Ph.D.,** the IMACS coordinators from NIEHS, accepted the award on behalf of the group and their fellow co-chair, David Isenberg, M.D., from the University College London.

- **Sue Fenton, Ph.D.,** Group Leader in the NTP laboratory Reproductive Endocrinology Group, will receive the NIH Graduate Partnerships Program Outstanding Mentor Award at the 16th Annual NIH Graduate Student Research Symposium on February 20, 2020. Every year, the Symposium recognizes three outstanding mentors for their leadership and dedication to their graduate students. Dr. Fenton was chosen based on the nomination essay written by Bevin Blake.

- **NIEHS Science Days**
    - Mentor of the Year: ***Robin Stanley, Ph.D.**, **Stadtman Investigator**, Nucleolar Integrity Group, Signal Transduction Laboratory*
    - Fellow of the Year: ***Fei Zhao, Ph.D., IRTA Postdoc**, Reproductive Developmental Biology Group, Reproductive & Developmental Biology Laboratory*
    - Best Oral Presentation: ***Jonathan Busada, Ph.D**., **IRTA Postdoc**, Molecular Endocrinology Group, Signal Transduction Laboratory*
    - Best Poster Presentations:
        - ***Jacob Gordon, IRTA Postbac,** Nucleolar Integrity Group, Signal Transduction Laboratory*
        - ***Daisy Lo, Ph.D.**, **Visiting Fellow**, Nucleolar Integrity Group, Signal Transduction Laboratory*
        - ***Monica Pillon, Ph.D. Visiting Fellow,** Nucleolar Integrity Group, Signal Transduction Laboratory*
        - ***Fei Zhao, Ph.D.**, **IRTA Postdoc**, Reproductive Developmental Biology Group, Reproductive & Developmental Biology Laboratory*
        - ***Cassandra Hayne, Ph.D.**, **IRTA Postdoc**, Nucleolar Integrity Group, Signal Transduction Laboratory*
        - ***Olivia Emery, IRTA Postbac**, Pregnancy & Female Reproduction Group, Reproductive & Developmental Biology Laboratory*

- ***Brad Klemm, Ph.D., IRTA Postdoc****, Mechanisms of Mutation Group, Genome Integrity & Structural Biology Laboratory*
- ***Brad Lackford, Biologist****, Stem Cell Biology Group, Epigenetics & Stem Cell Biology Laboratory*
- ***Oswaldo Lozoya, Ph.D., IRTA Postdoc****, Environmental Epigenomics & Disease Group, Immunity, Inflammation & Disease Laboratory*
- ***Natalie Saini, Ph.D., Visiting Fellow****, Mechanisms of Genome Dynamics Group, Genome Integrity & Structural Biology Laboratory*
- Best Poster Presentation by a Postbaccalaureate Fellow: ***Jacob Gordon, IRTA Postbac,*** *Nucleolar Integrity Group, Signal Transduction Laboratory*

- **GEMS Fall meeting**
  - **Elizabeth Martin, Ph.D.,** a postdoctoral fellow in the Eukaryotic Transcriptional Regulation Group, won a $1,500 travel grant for her talk on synthetic progestins. Those pharmaceutical compounds have been linked to increased susceptibility to invasive breast cancer
  - **Poster Competition**
    - **Michelle Campbell**, **M.S.,** a biologist in the Environmental Epigenomics and Disease Group, took first place honors.

- **NC SOT Awards**
  - **2019 Lifetime Achievement Award: Linda Birnbaum, Ph.D., D.A.B.T., A.T.S.**
  - **2019 President Award for Research Competition (PARC)**
    - First Place**: Dahea You, Pharm.D., Ph.D.,** postdoctoral fellow *Biomolecular Screening Branch DNTP*
      Population variability in developmental neurotoxicity modeled in vitro with Diversity Outbred mouse
  - **2019 Annual Meeting Graduate Student Platform Presentation Competition**
    - Third Place: **Troy Hubbard, Ph.D.,** IRTA fellow in the toxicology branch of DNTP
      Using Tox21 High-Throughput Screening Assays for the Evaluation of Botanical and Dietary Supplements
  - **2019 Annual Meeting Graduate Student Platform Presentation Competition**
    - First Place: **Bevin Blake**, predoctoral fellow Reproductive endocrinology group NTP laboratory
      GenX, a replacement for perfluorooctanoic acid (PFOA), disrupts maternal liver and the placenta in a comparative reproductive toxicity study in CD-1 mice
  - **2019 Annual Meeting Post-baccalaureate Poster Competition**
    - First Place: **Nancy Urbano**, Postbaccalaureate Fellow NTP Laboratory Predictive Toxicology and Screening Group
      In Vitro High-Throughput Screening of Chemical-Induced Oxidative Stress Using HepaRG Cells

- **Humphrey Yao, Ph.D.,** Senior Investigator, Reproductive Developmental Biology Group, Reproductive & Developmental Biology Laboratory, received funding from the NIH Office of Research on Women's Health (ORWH) to extend their work on transgenerational effects *of in utero* exposure to arsenic.

- **Katie O'Brien, Ph.D.,** Staff Scientist, Chronic Disease Epidemiology Group, Epidemiology Branch, received funding from the Office of Dietary Supplements for her research on vitamin D and breast cancer in African American participants in the Sister Study

- **Angelico Mendy, M.D., Ph.D.,** IRTA Postdoctoral Fellow in the Environmental Cardiopulmonary Disease Group, Immunity, Inflammation & Disease Laboratory was selected as the recipient of the Robert A. Cooke Memorial Lectureship award by the American Academy of Allergy, Asthma and Immunology

Grantees/Others

- **Tomás R. Guilarte, Ph.D.,** Professor and Dean of Stempel College, has been selected as one of NBCNews.com and NBC Latino's top Hispanics for 2019. Recognized worldwide for revealing the effects of developmental lead exposure on the central nervous systems and reversing such effects using behavioral interventions, Guilarte has also been a pioneer in validating and promoting the use of a biomarker of neuroinflammation that is now used in many research centers and clinics throughout the world to study diverse neurological conditions.

- Each year, the AZBio Awards and Life Science Fiesta celebrates leadership and innovation in the life sciences across Arizona. As part of this celebration on October 2, **Marti Lindsey, Ph.D.,** was named the Michael A. Cusanovich Arizona Bioscience Educator of the Year, an award honoring educators who demonstrate leadership and creativity to engage students in life sciences. Lindsey's work spans more than 18 years at the University of Arizona (UAZ), where she directs the Community Engagement Core (CEC) in the Southwest Environmental Health Sciences Center (SWEHSC). In this role, she works to stimulate discussions and collaborative interactions among SWEHSC researchers and the community. She also translates research findings into information to help communities understand how their environment affects their health.

- **Melissa Perry, Sc.D., M.H.S.,** a professor of environmental and occupational health at the George Washington University Milken Institute School of Public Health (Milken Institute SPH), has been chosen to participate in the prestigious *Hedwig van Ameringen* Executive Leadership in Academic Medicine (ELAM) Fellowship. The ELAM program, based at Drexel University College of Medicine, is the only one in North America dedicated to preparing women for senior leadership roles in schools of medicine, dentistry, public health and pharmacy. The program helps women develop professional and personal leadership skills, with a special focus on the challenges that face women in leadership positions. The ELAM program was developed specifically for female faculty at the associate or professor levels at universities who demonstrate potential for assuming executive leadership positions within five years.

- The NIH Director's Transformative Research Award, established in 2009, promotes cross-cutting, interdisciplinary approaches and is open to individuals and teams of investigators who propose research that could potentially create or challenge existing paradigms. NIEHS grantees **Peter Dedon, M.D., Ph.D.,** and **Eric Alm, Ph.D.,** both of the Massachusetts Institute of Technology, have received a 2019 National Institutes of Health (NIH) Director's Transformative Research

Award. Their project will examine how epigenetic changes in the gut microbiome can affect human health. Epigenetic changes are potentially heritable and can alter gene activity but not DNA sequences.

- Grantee **Carmen Velez Vega, Ph.D**., from University of Puerto Rico, was awarded the APHA's Helen Rodriguez-Trias Social Justice Award. She was recognized for educating local communities about key public health issues following the Zika virus outbreak in 2016 and Hurricane Maria in Puerto Rico in 2017. For example, she provided information about how to avoid infection and contaminated drinking water. She also led efforts to distribute items such as mosquito nets, water filters, and batteries.

- **Elana Elkin, Ph.D.,** is the 22nd recipient of the annual Karen Wetterhahn Memorial Award. Elkin is a trainee in the Northeastern University Puerto Rico Test site for Exploring Contamination Threats (PROTECT) SRP Center. The announcement was made in Seattle on Nov. 19, during the SRP annual meeting.

- **SOT Awards**
    - **Distinguished Toxicology Scholar Award: Shuk-mei Ho, Ph.D.,** Vice Chancellor for research and innovation at the University of Arkansas for Medical Sciences has been awarded the 2020 SOT Distinguished Toxicology Scholar Award for her pivotal work elucidating the role of endocrine disruptors in disease and on the developmental origins of adult disease.
    - **Merit Award: Norbert E. Kaminski, Ph.D.,** professor of pharmacology and toxicology at Michigan State University has received the 2020 SOT Merit Award for his sustained and highly influential contributions to the discipline of toxicology.
    - **Bruce A. Fowler Undergraduate Educator Award: Christine Perdan Curran, Ph.D., associate professor of biological sciences at** Northern Kentucky University, has been awarded the 2020 SOT Undergraduate Educator Award for her excellence, creativity, and success in undergraduate instruction in toxicology and the sciences as a whole.