The National Academies of SCIENCES ENGINEERING MEDICINE

EMERGING SCIENCE FOR ENVIRONMENTAL HEALTH DECISIONS

Leveraging Advances in Remote Geospatial Technologies
to Inform Precision Environmental Health Decisions

PARTICIPANT BIOGRAPHIES

(Listed In Alphabetical Order)

SUSAN ANENBERG*, Ph.D. is an Associate Professor of Environmental and Occupational Health and of Global Health at the George Washington University Milken Institute School of Public Health and chaired the workshop planning committee. Dr. Anenberg studies the health implications of air pollution and climate change. She has used satellite remote sensing, atmospheric modeling, and mobile monitoring to assess air pollution health risks at global, national, urban, and sub-urban scales. Her current work includes estimating inequity in air pollution health risks within cities and developing decision-support tools to integrate air quality, public health, and greenhouse gas mitigation. She is a member of the NASA Health and Air Quality Applied Sciences Team and Secretary of the American Geophysical Union's GeoHealth section. Dr. Anenberg has been a Co-Founder and Partner at Environmental Health Analytics, LLC, the Deputy Managing Director for Recommendations at the U.S. Chemical Safety Board, an environmental scientist at the U.S. Environmental Protection Agency, and a senior advisor for clean cookstove initiatives at the U.S. State Department. Her research has been published in top academic journals such as *Science, Nature,* and *Lancet Planetary Health.* She has also led or contributed to many science-policy reports on air quality and climate change published by U.S. Environmental Protection Agency, World Bank, World Health Organization, United Nations Environment Programme, and others. She received her B.A. in Biology and Environmental Sciences from Northwestern University and her M.S. and Ph.D. in Environmental Science and Engineering and Environmental Policy from the University of North Carolina.

JOHN M. BALBUS, M.D., M.P.H., serves as a senior advisor to the Director on public health issues and as NIEHS liaison to its external constituencies, stakeholders, and advocacy groups. He also leads NIEHS efforts on climate change and human health. In this capacity he serves as HHS principal to the U.S. Global Change Research Program, for which he also co-chairs the Interagency Cross-Cutting Group on Climate Change and Human Health. Dr. Balbus' background combines training and experience in clinical medicine with expertise in epidemiology, toxicology, and risk sciences. Before joining the NIEHS, Dr. Balbus was Chief Health Scientist for the non-governmental organization Environmental Defense Fund. He served on the faculty of The George Washington University, where he was founding Director of the Center for Risk Science and Public Health, founding co-Director of the Mid-Atlantic Center for Children's Health and the Environment, and Acting Chairman of the Department of Environmental and Occupational Health. Dr. Balbus received his A.B. degree in Biochemistry from Harvard University, his M.D. from the University of Pennsylvania, and his M.P.H. from the Johns Hopkins School of Public Health. In addition to current membership on the Institute of Medicine Roundtable on Environmental Health Sciences, Research and Medicine, Dr. Balbus has also served as a member of the EPA Science Advisory Board, the National Research Council's Board on Environmental Studies and Toxicology and the EPA Children's Health Protection Advisory Committee.

JAYAJIT CHAKRABORTY, Ph.D. is a Professor of Geography in the Department of Sociology & Anthropology and the Founding Director of the Socio-Environmental & Geospatial Analysis (SEGA) Lab at UTEP. Prior to joining UTEP, Dr. Chakraborty was a Professor and Chair in the Geography Division of the Department of Geography, Environment, and Planning at the University of South Florida (Tampa, Florida). He was also a visiting scholar in the Climate Change Research Centre at the University of New South Wales (Sydney, Australia). As a broadly trained social scientist, Dr. Chakraborty's research interests encompass a wide range of contemporary environmental and social justice issues. Specific topics include environmental justice, vulnerability to hazards and disasters, environmental health, racial/ethnic disparities, climate justice, sustainability, and urban environmental change. His research utilizes both traditional and

newly emerging methodologies, including the application of GIScience and spatial statistical techniques. Information on his ongoing research projects in the SEGA Lab is available here. Dr. Chakraborty has authored numerous articles in prominent academic journals such as *American Journal of Public Health, Annals of the Association of American Geographers, Disasters, Environment & Planning A, Environmental Research, Health & Place, Risk Analysis, Social Science & Medicine,* and *Urban Geography*. He has coauthored/coedited four books, including the recently published *Geographies of Behavioral Health, Crime, and Disorder: The Intersection of Social Problems and Place* and *The Routledge Handbook of Environmental Justice*. He was also a recipient of the University of Texas System Faculty STARs Award. Dr. Chakraborty has served on advisory committees and review panels for the AAG, EPA, NSF, National Institutes of Health (NIH), and National Academies of Sciences, Engineering, & Medicine (NASEM). He is currently serving on the editorial boards of the following journals: *Environment, Development and Sustainability*, *International Journal of Environmental Research and Public Health,* and *Environmental Justice.*

WEIHSUEH A. CHIU*†, Ph.D. is a professor in the Department of Veterinary Integrative Biosciences at the Texas A&M University. His research focuses on the development of quantitative, data-driven approaches for understanding and predicting the human health effects of environmental chemicals. Specifically, his research applies computational and statistical methods to transform data into knowledge used to protect public health. He also has an interest in approaches to estimate the variability in individual susceptibility to environmental exposures, so as to better protect sensitive subpopulations. Dr. Chiu currently serves on the National Academies' standing committee on Use of Emerging Science for Environmental Health Decisions. His previous service on National Academies committees includes the Committee on Endocrine-Related Low Dose Toxicity and the Committee on Predictive-Toxicology Approaches for Military Assessments of Acute Exposures. He received a Ph.D. in physics from Princeton University.

YUXIA CUI*, Ph.D., is a health scientist administrator at the National Institute of Environmental Health Sciences (NIEHS). Dr. Cui oversees the exposure science and the exposome grant portfolio that is focused on emerging technologies towards improved exposure and risk assessment in environmental health research. These include sensor technologies, omics-based approaches, computational and informatics-based methodologies, as well as other innovative approaches to enable an integrated view and better understanding of the exposome. Cui currently serves as the program officer for the laboratory network of the Human Health Exposure Analysis Resource (HHEAR). She is also a member of the NIH Common Fund Metabolomics Program leadership team and oversees the day-to-day operations of the Program. Cui received training in molecular toxicology and transcriptomics and received her doctorate in Environmental Toxicology from Duke University.

KEVIN C. ELLIOTT*†, Ph.D. is Professor at Michigan State University with joint appointments in Lyman Briggs College, the Department of Fisheries and Wildlife, and the Department of Philosophy. He received his Ph.D. in History and Philosophy of Science from the University of Notre Dame. His research lies at the intersection of the philosophy of science and practical ethics, with an emphasis on critically examining the ways in which ethical and social values influence science and technology. Much of his work has focused on policy-relevant areas of research on environmental pollution. Since 2014, he has been serving as a member of the Advisory Council for the National Institute of Environmental Health Sciences, and he is the Program Chair for the 2018 Biennial Meeting of the Philosophy of Science Association. He has authored a wide range of articles and book chapters and has published two books with Oxford University Press: "Is a Little Pollution Good for You? Incorporating Societal Values in Environmental Research" (2011) and "A Tapestry of Values: An Introduction to Values in Science" (2017). He has co-edited two other books: "Exploring Inductive Risk: Case Studies of Values in Science" (with Ted Richards, Oxford University Press, 2017) and "Current Controversies in Values and Science" (with Dan Steel, Routledge Press, 2017).

RIMA HABRE, Sc.D. is an Associate Professor of Environmental Health and Spatial Sciences at the University of Southern California. Her research aims to understand the effects of co-occurring environmental exposures, air pollution mixtures and social stressors on the health of vulnerable populations across the life course. She develops methods to advance personal exposure assessment using personal monitoring (e.g., wearables, sensors), geolocation, and machine-learning based spatiotemporal models. Dr. Habre co-chairs the Geospatial Working Group in the national NIH Environmental

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Influences on Child Health Outcomes (ECHO) program. She co-leads the Exposure Sciences Research Program in the Southern California Environmental Health Sciences Center (NIEHS Core Center). Dr. Habre is also the Director of Exposure Assessment in two large research centers at USC investigating the effects of air pollution exposure during pregnancy and the postpartum period on maternal and child health. She received her Doctor of Science in environmental health with a concentration in exposure science from the Harvard T.H. Chan School of Public Health.

MARCCUS HENDRICKS, Ph.D., M.P.H. is Assistant Professor and Director of The Stormwater Infrastructure Resilience and Justice (SIRJ) Lab at the School of Architecture, Planning and Preservation at the University of Maryland, College Park. Dr. Hendricks' primary research interests include stormwater infrastructure planning and management, social vulnerability to disaster, environmental justice, hazard mitigation, sustainable development, public health and the built environment, and participatory action research. He takes a mixed-methods approach to his research that includes both quantitative and qualitative methods such as multiple regression, cross-sectional research, spatial mapping, in-depth interviewing, participatory action research, and different forms of spatial and analytic epidemiology, among others. While at UMD, Hendricks has received two early-career awards from both the *National Academies of Science Gulf Research Program* and *The JPB Environmental Health Fellows Program* at *Harvard T. H. Chan School of Public Health*. He also participated in a congressional briefing entitled *"Addressing the Impact of Climate Change on Public Health and Natural Disasters"* on Capitol Hill in Washington, DC, and was quoted from his participation in *Scientific American*. He has also been featured in public media on the local morning show *Get Up DC* and *Grist Magazine* discussing the Ellicott City, MD floods. He is a Faculty Research Affiliate with the Clark School of Engineering's Center for Disaster Resilience, the National Center for Smart Growth Research and Education, and the Environmental Finance Center. Dr. Hendricks is a founding fellow of the William Averette Anderson Fund (the first national interdisciplinary organization working to increase the number of underrepresented persons of color in the field of disaster research, practice, and pedagogy) and currently serves as a board member for the Fund. He holds a Ph.D. in Urban and Regional Science and a Master of Public Health, both from Texas A&M University. He completed his undergraduate work at the University of North Texas.

PETER JAMES, Sc.D. is an Assistant Professor in the Division of Chronic Disease Research Across the Lifecourse (CoRAL) in the Department of Population Medicine at Harvard Medical School and Harvard Pilgrim Health Care Institute, as well as the Department of Environmental Health at the Harvard TH Chan School of Public Health. Trained in environmental health and epidemiology, Peter has focused his research on estimating the influence of geospatial factors, including exposure to nature, the built environment, the food environment, air pollution, light pollution, noise, and socioeconomic factors, on health behaviors and chronic disease risk. He has over a decade of experience working with large prospective cohort studies, including the Nurses' Health Studies, the Framingham Heart Study, and the Southern Community Cohort Study, where he has aided in the creation of many geospatial variables and linked them to health data. He is developing methodologies to assess real-time, high spatio-temporal resolution objective measures of location and behavior by linking smartphone-based global positioning systems (GPS) and consumer wearable device accelerometry data to understand how geospatial factors influence health behaviors. Most recently, he is creating novel metrics of geospatial factors by applying Deep Learning algorithms to Google Street View imagery.

CHARLES LEE is the Director of the Office of Environmental Justice at U.S. EPA. Mr. Lee is widely recognized as a true environmental justice pioneer. Previously, he was Director of Environmental Justice for the United Church of Christ Commission for Racial Justice. Mr. Lee is the architect of the two landmark seminal national events in the emergence of environmental justice as a significant national issue: the landmark 1987 'Toxic Wastes and Race in the United States' report and the historic 1991 National People of Color Environmental Leadership Summit. He has served on numerous panels, boards, and official federal advisory committees. Mr. Lee was a founding member of the "Michigan Coalition" group responsible for dialogue that led in 1992 to the establishment of the EPA Office of Environmental Equity (now Office of Environmental Justice). He is the editor of three books: Proceedings of First National People of Color Environmental Leadership Summit, Racism and Public Education: Challenges for the 21st Century, and Residential Apartheid: The American Legacy.

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JING LI*, Ph.D. is an associate professor of Geospatial Science at the University of Denver. Previously, she received a Ph.D. in Earth Systems and Geoinformation Sciences at George Mason University in 2012 where she performed GIS analysis on multiple data sources to investigate sociological problems and designed and implemented geospatial data models for 3D spatial-temporal data. Her areas of research expertise are spatiotemporal modeling and analysis, multidimensional geovisualization, and high-performance geo-computation. The over-arching goal of her research is to develop novel methods to address fundamental challenges in big-data driven applications within the geosciences, by: 1) providing effective analytical models and visualization algorithms to facilitate the understanding of complex geographic processes ingrained in big data, and 2) providing efficient data processing capabilities to enable time critical applications. She has contributed to more than 50 publications including peer-reviewed journal articles and book chapters and funding for her work has been provided by federal geospatial agencies such as the U.S. Geological Survey as well as leading IT companies such as Microsoft and Amazon. Currently, her research focuses on developing AI models to quantify and predict the community spread dynamics of COVID-19 to support better implementation of mitigation measures at fine spatiotemporal levels.

YANG LIU, Ph.D. is the Gangarosa Distinguished Professor and Chair of the Gangarosa Department of Environmental Health at the Rollins School of Public Health of Emory University. He received his Ph.D. in environmental science and engineering from Harvard Graduate School of Arts and Sciences in 2004, and completed his postdoctoral training at Harvard T.H. Chan School of Public Health. His research interests include satellite aerosol retrieval and product design, applications of satellite remote sensing in public health research, potential impacts of global climate change on public health, machine learning and spatial statistics. Over the past 17 years, Dr. Liu has been funded by NASA, CDC, NIH, EPA, HEI, and WHO to apply various satellite data products in modeling population exposure to various environmental stressors such as air pollution, extreme heat, wildland fires, and UV radiation, as well as the associated adverse health outcomes. He was an ORISE faculty fellow at the National Center for Environmental Health at the US Centers for Disease Control and Prevention. Dr. Liu is a science team member of the NASA EVI-3 MAIA investigation and Terra MISR mission, and a PI member of the NASA Air Quality Applied Science Team (AQAST) and Health and Air Quality Applied Science Team (HAQAST). He is a 2019 and 2020 Clarivate Global Highly Cited Researcher.

SHERYL MAGZAMEN, Ph.D., M.P.H. is an Associate Professor in the Department of Environmental and Radiological Health Sciences at Colorado State University. She holds appointments in the Department of Epidemiology at the Colorado School of Public Health and the Veterans Administration (VA) Eastern Colorado Health Care System. Sheryl's primary research focus is understanding the relative contribution of social factors and environmental exposures on chronic respiratory disease. She has worked extensively in the elementary school setting on developing surveillance methods and educational programs for childhood asthma, understanding the role of lead exposure in educational outcomes, and analyzing the role of social culture and indoor environmental quality and the health and performance of students and teachers. She has active collaborations with exposure scientists to develop refined exposure assessment models in community and agricultural settings in studies of childhood and occupational respiratory disease. Her current methodological work focuses on application of novel approaches to understand environmental pollutant mixtures in community-based studies. Since moving to Colorado State in 2013, she has been fortunate to collaborate with a talented group of physical and social scientists on the health effects of wildfire smoke.

CECILIA MARTINEZ, Ph.D., M.P.A. is the Senior Director for Environmental Justice (EJ) at the Council for Environmental Quality (CEQ). In this role, she will be facilitating the coordination of the whole-of-government EJ agenda of the Biden administration. Previously she was the Executive Director of the Center for Earth, Energy and Democracy. Dr. Martinez also previously held positions as Associate Research Professor in the College of Earth, Ocean and Environment at the University of Delaware. She has led a variety of projects to address sustainable development at the local, state and federal level. Her work focuses on the development of energy and environmental strategies that promote equitable and sustainable policies. She received her B.S. from Stanford University, and M.P.A. from New Mexico State University, and her Ph.D. from the University of Delaware's College of Urban Affairs and Public Policy.

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PABLO MÉNDEZ-LÁZARO, Ph.D. is currently an Associate Professor at the Department of Environmental Health of the University of Puerto Rico, Graduate School of Public Health. Dr. Méndez-Lázaro is currently PI and Co-PI on NASA research projects exploiting new technologies in ways that benefit all segments of socio-ecological and technological systems by applying Earth Observing Data and Remote Sensing to research on public health and vulnerable populations. He is an active Member of the Puerto Rico Climate Change Council, and one of the six (6) scientists nominated by the Governor of Puerto Rico and confirmed by both the Senate and House of Representatives of Puerto Rico for the Executive Committee on Climate Change Adaptation Plan.

AUBREY K. MILLER, M.D. a retired Captain of the U.S. Public Health Service Commissioned Corps, is board certified in occupational and environmental medicine. He is currently the Senior Medical Advisor to the Director of the National Institute of Environmental Health Sciences (NIEHS), where he oversees legislative, policy, strategic planning, and coordination of environmental health issues and activities among U.S. federal agencies, congress, academia, and other stakeholders. His experience includes numerous public health investigations and research studies involving a wide range of occupational and environmental health issues, including TB transmission among health workers; and asphalt fume, hazardous mineral fibers, and oil spill clean-up exposures and disease. He has contributed to the leadership and management of large-scale disaster responses including the Public Health Emergency in Libby, Montana, involving widespread asbestos contamination; major hurricanes; the H1N1 influenza; Ebola and Zika outbreaks; the Sept. 11, 2001, attacks; anthrax attacks; and the Gulf Oil Spill. He currently leads the NIH Disaster Research Response Program (DR2) which focuses on improving national and international disaster research capabilities through enhancing policies, infrastructure, training, and integration of stakeholders, especially academia and impacted communities. Aubrey Miller received a M.D. from Rush Medical College and a M.P.H. in environmental and occupational health and bachelor's degrees in biology and political science from the University of Illinois.

MARIE LYNN MIRANDA, Ph.D., M.A. specializes in research on environmental and public health, especially how the environment shapes health and wellbeing among children. She is the founding director of the Children's Environmental Health Initiative, a research, education, and outreach program committed to fostering environments where all people can prosper. She is a leader in the rapidly evolving field of geospatial health informatics. She is also Adjunct Professor of Pediatrics at Duke University, Baylor College of Medicine, and Indiana University. Miranda has applied spatial analytic approaches to a wide range of scientific issues. She maintains an active research portfolio, with a funding history that includes the USEPA, NIH, CDC, the National Association of Chronic Disease Directors, the USDA, the State of North Carolina, the Robert Wood Johnson Foundation, the Environmental Defense Fund, the Wallace Genetics Foundation, the Mary Duke Biddle Foundation, and The Duke Endowment. Her research group received the 2008 U.S. Environmental Protection Agency's Environmental Justice Award. Miranda is a Phi Beta Kappa, *summa cum laude* graduate of Duke University, where she earned her A.B. in mathematics and economics and was named a Truman Scholar. She has a Ph.D. and M.A. from Harvard University, where she held a National Science Foundation Graduate Research Fellowship. She is a fellow of the American Association for the Advancement of Science and a member of Sigma Xi.

MELISSA PERRY[†], Sc.D., M.H.S. is a Professor of Environmental and Occupational Health and Interim Associate Dean for Research in the Milken Institute School of Public Health at the George Washington University (GWU). Before joining GWU, she spent 13 years on the Harvard School of Public Health's Department of Environmental Health faculty. As an environmental and occupational epidemiologist, Dr. Perry's research focuses on the health impacts of environmental chemicals with particular focus on reproduction, and on the prevention of occupational injuries and disease. Her lab at GWU examines environmental impacts on sperm and male fertility. She is the Chair of the Board of Scientific Counselors for the National Center for Environmental Health/Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention; co-chair of the National Academies' Committee on Emerging Science for Environmental Health Decisions; a Fellow of the Collegium Ramazzini; and a member of the Technical Advisory Board for the Center for Construction Research and Training. She has served as President of the American College of Epidemiology and as a standing member of the National Institute for Occupational Safety and Health study section. She is currently an associate editor of Environmental Health Perspectives and an editorial board member of Environmental Health. She

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received her B.A. from the University of Vermont, and her M.H.S. and Sc.D. from The Johns Hopkins University School of Hygiene and Public Health.

ANA PRADOS, Ph.D. is an atmospheric chemist and public policy professional. Currently, she is a Research Associate Professor at the University of Maryland Baltimore County, where she teaches courses in environmental policy. She is also the program manager of NASA's Applied Remote Sensing Training (ARSET) program. Dr. Prados has 20 years of experience in air quality monitoring, modeling and research applications of satellite remote sensing. She has authored peer-reviewed publications and is a guest editor of scientific journals. Her main area of interest is in bridging the gap between earth observations and decision-making. She joined NASA Goddard Space Flight Center in 2007, where she developed a training program that builds skills in the utilization of satellite remote sensing for decision-support. Program partners and participants include government regulatory agencies, businesses, non-governmental organizations and academic institutions. She has built capacity for agencies worldwide on how to use earth observations for air pollution, disaster, land use and water resources management; and for monitoring the United Nations Sustainable Development Goals. Dr. Prados also has expertise in program evaluation and has co-developed workshops on the evaluation of applied research and data management projects at federal agencies (NASA, NOAA, EPA) and academic institutions. She received a Ph.D. in Chemistry and a master's in Public Policy from the University of Maryland College Park.

KRISTI PULLEN FEDINICK†, Ph.D. is a Senior Scientist and the Director of Science and Data in the Healthy People & Thriving Communities (HPTC) Program at the Natural Resources Defense Council. She also serves as part-time faculty in the Department of Environmental and Occupational Health of the Milken Institute School of Public Health at The George Washington University. Dr. Pullen Fedinick's research career includes experience in environmental health and policy; molecular, structural, and computational biology; biochemistry; and population health. Prior to joining NRDC, she worked as a scientist for a Chicago-based environmental non-profit, where she focused on air and drinking water quality, science communications, and environmental justice. Her current work focuses on the use of high-throughput technologies, predictive toxicology, and computational approaches to chemical risk assessments. Additional work includes the geospatial and statistical analysis of chemicals in the environment, with a particular emphasis on drinking water and on the disproportionate impact of chemical exposures in vulnerable populations. She holds a bachelor's degree in biochemistry and molecular biology from the University of Maryland Baltimore County and a Ph.D. in molecular and cell biology with a focus on structural biology and biochemistry from the University of California, Berkeley. She was a Robert Wood Johnson Foundation Health and Society Scholar at the Harvard T. H. Chan School of Public Health.

LISA RASMUSSEN, Ph.D. is a Professor in the Department of Philosophy, and Faculty Fellow in the Graduate School, at the University of North Carolina at Charlotte. Her research focuses on ethical issues in research, and she is particularly interested in thinking about ethics in unregulated research areas like citizen science and DIY Bio. Dr. Rasmussen teaches in the areas of bioethics and research ethics. She is the Editor-in-Chief of *Accountability in Research*; a Co-Editor of the Philosophy & Medicine book series, published by Springer; and an Associate Editor of Citizen Science: Theory and Practice. She received her Ph.D. in Philosophy from Rice University and Bs.C. in Earth Sciences from University of California, Santa Cruz.

ERIK SVENDSEN, Ph.D. is an environmental and disaster epidemiologist working with populations which have been or are continuing to be uniquely exposed to hazards within their environment, especially inhalation disaster populations. His recent research focus has been on how the lungs are impaired, recover, and age following environmental injury, either from air pollutants, radiation, or irritant gas exposures. He is the PI of a longitudinal cohort study of a population exposed to a chlorine inhalation disaster, and he helped develop sister studies to improve the clinical triage tools in such inhalation disaster events. He has responded to many environmental health emergencies, and helped train the public workforce across the Southeastern region for all-hazards disasters. Dr. Svendsen is a Professor and the Leader of the Environmental Health Division at the Medical University of South Carolina (MUSC), with a dual affiliation in Pulmonary Medicine. He has been working in the Ukraine since 2007 to study the lung health of a peasant cohort exposed to Chernobyl radiation. In late 2011 he began consulting with federal public health colleagues within Japan on the recovery

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from the Fukushima disaster. Dr. Svendsen has collaborated with the DHS on disaster preparedness and national security studies since 2005, and more recently with the IOM. His international consultations on inhalation disasters include the FOI in Sweden. He has been active in the ATS and the EOPH Assembly since 2002, and the TID Section since 2005. Last year he was a part of the writing team which published the TID review paper on chemical inhalation disasters. Dr. Svendsen has been engaged with the NIH CounterACT program for several years, and is currently funded through a collaboration there. Dr. Svendsen has the required experience, knowledge, and time to lead the TID forward.

GRACE TEE LEWIS, Ph.D. is an Environmental Epidemiologist focusing on health impacts of criteria and hazardous air pollutants, particularly among environmental justice communities. Her work includes mapping and development of a data driven tool to identify, prioritize, and visualize risk factors contributing to neighborhood vulnerability from inequities in environment, health, climate, and social stressors. Dr. Tee Lewis supports community based organizations by providing scientific expertise for their advocacy efforts and development of environmental justice action plans. Her work also focuses on understanding health risks related to the marine and transportation sectors and strategies to improve regional air quality, monitoring and public health. Dr. Tee Lewis has a Ph.D. from the University of Texas School of Public Health in Epidemiology with concentrations in Environmental Health Science and Biostatistics.

SACOBY WILSON*, Ph.D., M.S. is an Associate Professor with the Maryland Institute for Applied Environmental Health and Department of Epidemiology and Biostatistics in the University of Maryland, College Park School of Public Health. Dr. Wilson has 15 years of experience as an environmental health scientist in the areas of exposure science, environmental justice, environmental health disparities, community-engaged research including crowd science and community-based participatory research, water quality analysis, air pollution studies, built environment, industrial animal production, climate change, community resiliency, and sustainability. Dr. Wilson directs the Community Engagement, Environmental Justice and Health (CEEJH) laboratory that is focused on providing technical assistance and research support to communities fighting against environmental injustice and environmental health disparities in the DMV region and across the nation. He has worked on environmental justice issues including environmental racism with community-based organizations through community-university environmental health and justice partnerships in South Carolina and North Carolina including the Low-Country Alliance for Model Communities (LAMC), in North Charleston, South Carolina; the West End Revitalization Association (WERA) in Mebane, NC; and the Graniteville Community Coalition (GCC) in Graniteville, SC. Dr. Wilson received his B.S. degree in Biology/Ecotoxicology with a minor in Environmental Science from Alabama Agricultural and Mechanical University, M.S. degree in Environmental Health from University of North Carolina-Chapel Hill and his Ph.D. in Environmental Sciences and Engineering from University of North Carolina-Chapel Hill.

RICHARD WOYCHIK, Ph.D. is Director of the National Institute of Environmental Health Sciences and the National Toxicology Program as well as PI for the Mammalian Genome Research Group in the Division for Intramural Research at NIEHS. He is a molecular geneticist with a Ph.D. in molecular biology from Case Western Reserve University and postdoctoral training with Dr. Philip Leder at Harvard Medical School. He spent almost 10 years at Oak Ridge National Laboratory rising in the ranks to become head of the Mammalian Genetics Section and then director of the Office of Functional Genomics. In August 1997, he assumed the role of vice chairman for research and professor in the Department of Pediatrics at Case Western Reserve University. In 1998, he moved to the San Francisco Bay area, first as the head of the Parke-Davis Laboratory for Molecular Genetics and then as chief scientific officer at Lynx Therapeutics. He returned to academics as the president and CEO of The Jackson Laboratory in August 2002 and served in that role until January 2011. He began his current position in February 2011.

EUNHYE ENKI YOO, Ph.D., is an Associate Professor of Geography at the University at Buffalo (UB), The State University of New York and an affiliate faculty at the National Center of Geographic Information and Analysis (NCGIA). Dr. Yoo was trained as a GIScientist with expertise in geostatistics. She conducts research on fundamental issues in Geography, such as scales and errors/uncertainty, and uses GIS, satellite remote sensing/mathematical models, and geospatial analyses/modeling techniques to address geographic problems in social and environmental science. In recent years, her research projects have focused on air pollution exposure assessments in environmental epidemiology using both the

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geospatial data fusion and error modeling to combine sources of information with different spatial resolutions and heterogeneous quality, such as sparse monitoring measurements and satellite-derived aerosol optical depth. Dr. Yoo's research has also involved the development of an efficient method to incorporate time-activity data measured with GPS-equipped cellphones into an exposure model designed to estimate individuals' exposures to fine particulate matter ($PM_{2.5}$).

BENJAMIN ZAITCHIK, Ph.D., M.S. is a Professor in the Department of Earth and Planetary Sciences at Johns Hopkins. He is an Earth scientist whose work includes study of fundamental atmospheric and hydrological processes as well as application of this knowledge to problems of water resources, agriculture, and human health. In this context, Dr. Zaitchik leads multiple projects focused on the propagation of climate stresses through complex coupled natural-human systems. Recent work in this vein includes analysis of drought impacts on Food-Energy-Water dynamics in East Africa, development of disease risk early warning systems for malaria in South America and cholera in Africa, and seasonal forecasts for hydrological hazards in South Asia. Prior to joining Johns Hopkins University, Dr. Zaitchik was a Research Associate at NASA and a AAAS Fellow at the U.S. Department of State. He holds a Ph.D. in Geology & Geophysics from Yale University, an M.S. in Soil Sciences from Cornell University, and an A.B. in Biology from Harvard College. He is currently the President of the GeoHealth Section of the American Geophysical Union, Chair of the World Meteorological Organization Research Board Task Team on COVID-19 and climate, meteorological, and environmental factors, and a Commissioner on the City of Baltimore Sustainability Commission.

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