NATIONAL ACADEMIES Sciences Engineering Medicine

Indoor Chemistry and Environmental Justice: Housing, Consumer Products, and Health Risks

Location: National Academies of Sciences Auditorium

TUESDAY, SEPTEMBER 19, 2023 (ALL TIMES LISTED ET)

8:30 AM	**Optional: Early Morning Coffee** Provided by the Academies for In-person Attendees
9 AM	**Open Remarks and Introductions** Linda Nhon, Program Officer, Board on Chemical Sciences and Technology (BCST) Committee and Workshop Organization Team Ellison Carter, PhD, *Colorado State University* (Virtual) Rima Habre, ScD, *University of Southern California* Gillian Mittelstaedt, DrPH, MPA, *Tribal Healthy Homes Network* Heather Stapleton, PhD, *Duke University* (Virtual)
9:10 AM	**Why Indoor Chemistry Matters: Select Recommendations** Rima Habre
9:20 AM	**Moving Environmental Justice Indoors: Lessons from the Field** M. Patricia Fabian, ScD, Associate Director, *Boston University Institute for Global Sustainability*, and Associate Professor, *Boston University School of Public Health*
9:50 AM	**Asia Pacific Islander and Latino Youth Speak Out: Voices of Environmental Justice and the Crisis in Indoor Air Quality** Robin A. Evans-Agnew, RN, PhD, Associate Professor, *School of Nursing and Healthcare Leadership of the University of Washington, Tacoma* (Virtual)
10:20 AM	**Through a Tribal Community Health Lens: Field Stories of Risk Communication and Risk Mitigation** Ashley Schmidt, MSN RN, Community Health Nurse Lead, *The Tulalip Tribes* (Oral remarks)
10:50 AM	**Q&A with Keynote Speakers** Moderated by Gillian Mittelstaedt
11:30 AM	**Break for Lunch**
1:00 PM	**Call to Order post Lunch** Linda Nhon **SESSION ONE: Putting Environmental Exposures in Context: Frameworks for Research and Implementation to Holistically Address Environmental and Social Exposures**
1:10 PM	**Realistic Conditions: Considerations Conducting Research on Public Health Problems We Hope to Prevent** Madeleine L. Scammell, DSc, *Boston University School of Public Health* (Virtual)

1:30 PM **Understanding Indoor Exposures within the Broader Context of Cumulative Impacts and Structural Racism**
Micaela E. Martinez, PhD, Director of Environmental Health, *WE ACT for Environmental Justice*

1:40 PM **Q&A with Session One Speakers**
Moderated by Rima Habre

2 :10PM **Break (10 minutes)**

SESSION TWO: Community Engagement Approaches for Research, Practice, and Policy on EJ Considerations for Indoor Chemistry

2:20 PM **Making Homes Healthier through Community-Research Partnerships**
Robin E. Dodson, ScD, Associate Director of Research Operations and Research Scientist, *Silent Spring Institute*

2:45 PM **Moving Towards Improving Indoor Environmental Quality for All**
Miriam L. Diamond, PhD, *Diamond Environmental Research Group, Department of Earth Sciences, Earth Sciences Centre, University of Toronto* (Virtual)

3:05 PM **Q&A with Session Two Speakers**
Co-Moderated by Ellison Carter (Virtual) and Gillian Mittelstaedt

SESSION THREE: Perspectives on Air Cleaning Products, Air Sensors, and Impacts on EJ Communities

3:25 PM **Industrial Pollution, Environmental Injustice and Indoor Air: Leveraging Community Science for Action**
Jill Johnston, PhD, Associate Professor, *Keck School of Medicine of the University of Southern California* (Virtual)

3:45 PM **Working with Environmental Justice Communities to Deliver Healthier Homes**
Paul Francisco, Director of Indoor Climate Research and Training *Champaign County Regional Planning Commission* and Sr. Research Associate, *Colorado State University*

4:05 PM **Q&A with Session Three Speakers**
Co-Moderated by Heather Stapleton (Virtual) and Rima Habre

4:25 PM **Closing Remarks**

4:30 PM **Adjourn Day 1**

NATIONAL ACADEMIES Sciences Engineering Medicine

Indoor Chemistry and Environmental Justice: Housing, Consumer Products, and Health Risks

WEDNESDAY, SEPTEMBER 20TH, 2023 (ALL TIMES LISTED ET)

8:30 AM	**Optional: Early Morning Coffee** Provided by the Academies for In-person Attendees
9 AM	**Advancing Health, Opportunity, and Equity through Holistic Healthy Housing Intervention Programs: Remediating Toxins, Improving Indoor Air Quality, and Creating Climate Resilient Homes in Historically Disinvested Communities** Ruth Ann Norton, President and CEO, *Green and Healthy Homes Initiative*
9:30 AM	**Q&A with Keynote Speaker** Moderated by Rima Habre
10 AM	**Committee Panel on Next Steps Forward** Rima Habre, Gillian Mittelstaedt, and Heather Stapleton (Virtual)
12 PM	**Adjourn**

SPEAKER AND PLANNING TEAM BIOGRAPHIES

Ellison Carter is an associate professor in the Department of Civil and Environmental Engineering at Colorado State University. Dr. Carter has expertise in indoor air quality, exposure science, and indoor environments as places that support health and wellbeing. She conducts field-based assessments of personal, indoor, and outdoor air quality and human behaviors and the impacts of intervention in the home and workplace settings. Her research aims to contribute to the development and implementation of healthy housing and indoor environmental interventions in diverse domestic and international settings. She earned her PhD in civil engineering focused on indoor environmental science and engineering from the University of Texas at Austin. Her work as a JPB Foundation and Harvard Environmental Health Fellow broadened her research, teaching, and professional efforts to further integrate social and environmental factors as they relate to public health.

Miriam L. Diamond is a professor in the Department of Earth Sciences and School of the Environment at the University of Toronto. Her research over the past 30 years focuses on understanding and quantifying chemical emissions, their transport processes, and resultant human and ecological exposure. Her science and policy research has been published in over 200 peer-reviewed articles and chapters, in addition to receiving extensive media attention. Professor Diamond is an Associate Editor of the journal Environmental Science and Technology and sits on the Editorial Review board of Journal of Exposure Science and Environmental Epidemiology. She was the co-chair of the Canadian Chemical Management Plan Science Committee from 2017 to 2021, is the Vice-Chair of the International Panel on Chemical Pollution, and is the chemicals and waste expert on the Scientific and Technical Advisory Panel of the Global Environment Facility. She is a Fellow of the Royal Society of Canada, Royal Canadian Geographical Society and the Society of Environmental Toxicology and Chemistry.

Dr. **Robin E. Dodson** is an exposure scientist at Silent Spring Institute and an adjunct assistant professor at Boston University School of Public Health. Her research focuses on three main areas: development of novel exposure measurements for epidemiological and community-based studies, analysis of environmental exposure data with particular emphasis on semivolatile organic compounds (SVOCs), and interventions aimed at reducing chemical exposures. Dr. Dodson investigates environmental exposures of chemicals linked to a range of health outcomes, including asthma, altered neurological and reproductive development, and breast cancer. Her current research focuses on exposure to consumer product chemicals such as phthalates and flame retardant chemicals and has been used to identify exposure sources and implement effective exposure reduction strategies in homes. Dr. Dodson serves as the chair of the Massachusetts Toxics Use Reduction Institute's science advisory board and is an associate editor of the Journal of Exposure Science and Environmental Epidemiology. Dr. Dodson completed her doctorate in environmental health and masters in environmental science and risk management at Harvard T.H. Chan School of Public Health.

Dr. **Robin Evans-Agnew** is an associate professor in the vibrant University of Washington (UW) Tacoma's School of Nursing and Healthcare Leadership. He is focused on upstream actions to transform inequities, especially as they relate to asthma, environmental justice, and Planetary Health. As a community-based nurse researcher he has worked extensively with Black, Indigenous, People of Color for community transformation and environmental justice, including a 9-year Community-Based Participatory Research partnership with the Mujeres Latinas Apoyando la Comunidad, a group of new immigrant mothers of children with asthma. This group has developed and tested tools for: environmental assessment of daycares; woodsmoke pollution awareness; education of Spanish speaking immigrants on indoor air quality; and assessment of VOC exposures in immigrant homes. He leads a global initiative with Alliance of Nurses for Healthy Environments in developing the first Climate Justice Nursing Agenda for research, practice, and education. He gained his BSN at Johns Hopkins University in 1985; completed

his Masters in Nursing at the University of Washington (1998), and his PhD at UW (2011) was concerned asthma management inequities in Black urban youth from Seattle.

M. Patricia Fabian is an Associate Professor of the Department of Environmental Health, Associate Director at the Institute for Global Sustainability at Boston University, and the Boston site PI for the Consortium for Climate Risk in the Urban Northeast (CCRUN). She co-directs a community engaged research study to build resilience to extreme heat in the environmental justice communities of Chelsea and East Boston, and is principal investigator of a systems science project linking housing, indoor air quality, energy consumption, and health, and an indoor air quality and sustainability project in Boston K-12 schools. Her research projects are interdisciplinary and leverage data at multiple scales, including remote sensing and exposure assessment data, electronic health records, and geospatial databases of social and environmental determinants of health (SDOH). Her research group has published over 100 articles in the peer-reviewed literature, and she has been quoted in multiple media outlets. Dr. Fabian was a Steering Committee member for the Massachusetts Executive Office of Energy and Environmental Affairs on the 80x50 Greenhouse Gas Reduction Study.

Paul Francisco is a Senior Research Associate at Colorado State University and is the Director of the Indoor Climate Research and Training division of the Champaign County Regional Planning Commission in Illinois. He was formerly a Senior Research Engineer and Director of the Indoor Climate Research and Training program at the University of Illinois at Urbana-Champaign. Paul performs research on the intersection of energy efficiency and healthy homes with a focus on field measurements in homes undergoing retrofit, and with an emphasis on low-income communities. He also trains practitioners on how to assess homes for energy efficiency and healthy home upgrade opportunities. Paul is a Fellow of ASHRAE, received ASHRAE's 2020 Environmental Health Award, is the immediate past chair of the Building Performance Association Board of Directors, and is a member of the International Society for Indoor Air Quality and Climate. He received his Bachelor's degree in Mechanical Engineering at the University of Delaware and his Master's degree in Mechanical Engineering at the University of Washington.

Ecologist and justice advocate Dr. **Micaela E. Martinez** is the Director of Environmental Health at WE ACT for Environmental Justice, responsible for advancing the organization's efforts to improve environmental health in communities of color and low-income communities by promoting public health awareness, education, coalition-building, and advocacy. She earned her Ph.D. in Ecology and Evolution and previously served as an Assistant Professor at Columbia University Mailman School of Public Health and Emory University. Her research has focused on infectious disease ecology, social justice, climate change, maternal and infant health, and environmental impacts on health. Dr. Martinez is currently leading WE ACT's Beauty Inside Out campaign, which seeks to remove toxic chemicals from beauty products, particularly products that enforce Eurocentric beauty standards and are marketed toward women of color.

Gillian Mittelstaedt, DrPH, MPA, is an Air Quality and Environmental Health professional who leads the Tribal Healthy Homes Network, an EPA-funded program of the Tulalip Tribes that addresses indoor air hazards through national Tribal training, research, and design of culturally tailored interventions. Dr. Mittelstaedt also directs the Partnership for Air Matters, providing low-cost indoor air toolkits to engage and empower environmental justice communities. In her advocacy work, Dr. Mittelstaedt recently co-chaired EPA's Clean Air Act 50th Anniversary Report, advised the White House on indoor air quality and infectious disease transmission, and served on a National Academies of Science workgroup on Indoor Air Chemistry. She co-chairs the National Safe and Healthy Housing Coalition and is past chair of the Washington Asthma Initiative and the Washington Leadership Council for the American Lung Association.

Dr. **Rima Habre** is an Associate Professor of Environmental Health and Spatial Sciences at the University of Southern California (USC). She leads the Exposure Sciences Research Program in the USC Southern California Environmental Health Sciences Center. Her expertise lies in environmental health, air pollution, and exposure sciences. Her research aims to understand the effects of complex air pollution mixtures and climate change related exposures in the indoor and outdoor environment on the health of vulnerable populations. Dr. Habre's expertise spans measurement, spatiotemporal and GIS-based modeling, and mobile health approaches to assessing personal exposures and health risks. Dr. Habre received her Doctor of Science (ScD) in Environmental Health from the Harvard T.H. Chan School of Public Health in 2012.

Jill E. Johnston, PhD, is an Associate Professor and Director of Community Engagement Core (CEC) in the Division of Environmental Health at the University of Southern California (USC). As the director of CEC, she is responsible for two National Institutes of Health environmental health centers and serves as an medical sciences principal investigator (MPI) on two studies focused on air pollution and health disparities. Dr. Johnson is also the Co-Director of the Southern California Center for Children's Environmental Health Research Translation and an Interdisciplinary Research Fellow with Robert Wood Johnson Foundation. She also serves as the only academic Commissioner for the City of Los Angeles' Climate Emergency Mobilization Office. Dr. Johnson previously worked as a community organizer on issues of environmental and economic justice in South Texas. As an exposure scientist and environmental epidemiologist with extensive experience in community-based research and engagement methods, her research focuses on addressing unequal exposures to harmful contaminants that affect the health of working poor and communities of color. Engaging in collaborations with grassroots organizations to conduct community-engaged action-oriented research at USC to support environmental justice, she works towards strong partnership with local organizations, community health workers (promotores), policymakers and residents to address air pollution, upstream oil and gas extraction and incompatible land use. Dr. Johnston received her PhD in environmental sciences and engineering from the University of North Carolina at Chapel Hill, where she studied hazardous waste sites and industrial animal production.

Dr. **Linda Nhon** is a program officer with the Board in Chemical Sciences and Technology in the Division of Earth and Life Studies at the National Academies. In her current role she oversees various convening activities ranging from consensus studies to roundtables. She directed two major reports *Advancing Chemistry and Quantum Information Science* and *Chemical Terrorism: Assessing Strategies in the Era of Great Power Competition*. Dr. Nhon also manages the Chemical Sciences Roundtable, which is composed of 15 thought leaders spanning the chemistry enterprise. She has organized several workshops focused on different chemistry topics including innovations in catalysis, indoor chemistry, pharmaceutical manufacturing, and laboratory automation. Her portfolio also involves managing webinars on anticipatory issues like herbicide development, future of food science, hydrogen technologies, battery recycling, and many others. Dr. Nhon holds a Ph.D. in Chemistry and Biochemistry from the Georgia Institute of Technology, where she was a collaborator in the DOE's Energy Frontier Research Center – UNC Chapel Hill developing organic chromophores for solar fuel cell applications. As a material chemist, Dr. Nhon also synthesized and characterized families of small molecules for electrochromic devices under the support of the Air Force Office of Scientific Research. During her time at Georgia Tech, she served as a fellow with the Sam Nunn National Security Program. In that capacity, she studied US deterrence strategies and presented policy proposals to the US Special Operations Command. Dr. Nhon received her bachelor's in Microbiology and Cell Science from the University of Florida, where she first cultivated her passion for science policymaking.

Ruth Ann Norton is President and CEO of the Green and Healthy Homes Initiative, a nonprofit organization that is dedicated to advancing racial and health equity and opportunity through healthy housing. A national expert and advocate on green and healthy homes, she directs GHHI's groundbreaking work across the United States where 65 cities, counties and states are using housing as a platform for improved health and social outcomes. Through the implementation of the GHHI comprehensive housing intervention model and its best practices Toolbox that she helped develop, cities are improving the ability of children to arrive in the classroom healthy and ready to learn and to stay in school through reduced asthma related absences. The architect of the State of Maryland's 99% reduction in childhood lead poisoning, Ms. Norton has developed over 45 pieces of successful healthy housing legislation that focus on reducing health disparities. Through its current feasibility and development work with healthcare partners and jurisdictions nationally, she heads a GHHI technical assistance team that is creating sustainable models for Medicaid reimbursement for preventive asthma and household injury services. Ms. Norton serves as a member of the: EPA Children's Health Protection Advisory Committee, National Leadership Academy for the Public's Health (NLAPH), National Council of State Housing Agencies' National Advisory Group, Ohio Asthma Council, and Maryland Lead Poisoning Prevention Commission, and was previously a federally appointed liaison to the CDC's Advisory Committee on Childhood Lead Poisoning Prevention. A founding member of the NEWHAB Advisory Board, she provides a leading voice to articulate the significant health and social benefits of weatherization investments through her advisory role with Energy Efficiency for All (EEFA) and has authored research publications on the non-energy benefits of energy efficiency. Ms. Norton is a Robert Wood Johnson Foundation Community Health Leader, a Weinberg Foundation Fellow, a WE ACT Environmental and Social Justice awardee, and received the Tony Woods Award for Excellence from the Building Performance Industry in 2016 for her efforts to integrate energy efficiency upgrades with healthy homes interventions on a national scale. Under her leadership, GHHI has been awarded the HUD Secretary's Award for Healthy Homes and the EPA's National Environmental Leadership Award in Asthma Management for its innovative programs.

Dr. **Madeleine L. Scammell** is an Associate Professor of Environmental Health at Boston University School of Public Health. Her expertise is in the area of community-driven and community-based participatory research and includes the use of qualitative methods in the area of environmental health and epidemiologic studies. In 2017 Dr. Scammell was awarded an NIEHS/NIH Outstanding New Environmental Scientist award, establishing the Mesoamerican Nephropathy Occupational Study (MANOS), longitudinal study of agricultural workers in El Salvador and Nicaragua focused on identifying and preventing exposures associated with the epidemic of chronic kidney disease in Central America known as Mesoamerican Nephropathy (MeN). In 2021 Dr. Scammell was awarded a U01 to establish a Field Epidemiology Site as part of the NIDDK/NIEHS/Fogarty Institute CURE Consortium studying chronic kidney disease of uncertain etiology in agricultural communities. Both studies includes long term research relationships with investigators and workers in El Salvador and Nicaragua. In Massachusetts, Dr. Scammell leads the Local Public Health Institute with funding from the Massachusetts Department of Public Health. She co-leads the Chelsea and East Boston Heat Study, C-HEAT, examining exposure to heat and air quality where we live, work and play. Dr. Scammell chairs the board of directors of the Science and Environmental Health Network, and in 2014 co-edited *The Toxic Schoolhouse* published by Baywood Press (now Routledge).

Ashley Schmidt is the lead Community Health Nurse with the Tulalip Tribes Community Health Department in Tulalip, Washington. She leads a team of nurses and community resource coordinators. Ashley is a Tsimshian Alaska Native and Filipino, and she has spent her life in the Pacific Northwest Coast Salish land. To her, there is a great intersection between culture and health. Through this lens, she has had the opportunity to work with native communities at the Urban Indian Health Institute, Seattle Indian Health Board, Harborview Medical Center, and has been with Tulalip Tribes since 2019. Ashley's mission as the Lead Community Health Nurse is to guide and assist Tribal Members in achieving their highest goals of wellness through outreach, health education, and community engagement. She is dedicated to breaking silos within tribal government, bridging resources and information sharing, driven by an overall

goal of building strong tribal health systems that serve with equity and compassion. Through this work, she has developed culturally appropriate health monitoring services such as the Elder Wellness program and the Container for Life program. Ashley began her work addressing access to culturally relevant health services on a population-level while obtaining her undergraduate degree from the University of Washington in Medical Anthropology and Global Health in 2011. She went on to pursue her Registered Nurse license in 2017 and obtained her Master's Degree in Community Health Nursing in 2018 from Seattle University College of Nursing. Outside of work, Ashley fills her spirit by spending time with her three sons, husband, family and friends, and immersing herself in urban native culture in the Greater Seattle area. She is a current member of the Tsimshian Haayuuk Dance group and involves herself in all opportunities to serve Indian Country in her local area.

Professor **Heather Stapleton** is an environmental chemist and exposure scientist in the Nicholas School of the Environment at Duke University. Her research interests focus on identification of halogenated and organophosphate chemicals in building materials, furnishings and consumer products, and estimation of human exposure, particularly in vulnerable populations such as pregnant women and children. Her laboratory utilizes mass spectrometry, including targeted and nontargeted approaches, to characterize chemical burdens in both environmental samples and biological tissues to support environmental health research. Currently she serves as the Director for the Duke Superfund Research Center, and Director of the Duke Environmental Analysis Laboratory, which is part of NIH's Human Health Environmental Analysis Resource.