

**Invitation for Public Comment on the List of Candidates
For the Environmental Protection Agency's
Clean Air Scientific Advisory Committee (CASAC)
Ozone Review Panel**

January 21, 2022

The U.S. Environmental Protection Agency (EPA) Science Advisory Board (SAB) Staff Office announced in a Federal Register Notice (86 FR 63024-63205) on November 15, 2021, that it was inviting nominations of experts to be considered for appointment to the Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel. The CASAC Ozone Review Panel will provide advice through the Chartered CASAC on policy-relevant science to support the Agency's reconsideration of the National Ambient Air Quality Standards (NAAQS) for ozone. The SAB Staff Office sought nominations of nationally and internationally recognized scientists with demonstrated expertise and research in the field of air pollution related to criteria pollutants, in the following fields, especially with respect to ozone: Air quality, atmospheric science and chemistry; exposure assessment; toxicology; controlled clinical exposure; epidemiology; biostatistics; risk assessment; ecology, including of forests and terrestrial systems; and effects on welfare and the environment.

The SAB Staff Office received nominations for the attached 32 candidates based on their expertise and willingness to serve. We hereby invite public comments on the attached List of Candidates under consideration for appointment to the CASAC Ozone Review Panel. Comments should be submitted to Mr. Aaron Yeow, Designated Federal Officer, at yeow.aaron@epa.gov no later than **February 11, 2022**. E-mail is the preferred mode of receipt. Please be advised that public comments are subject to release under the Freedom of Information Act.

Candidates for the CASAC Ozone Panel

Bhagwan D. Aggarwal

Pennsylvania Department of Health

Dr. Bhagwan D. Aggarwal is a board Certified in Public Health (CPH) professional, and currently working as Health Educator/Epidemiology Research Associate at the Pennsylvania Department of Health. He has more than 20 years of global experiences at academic research institutions, government organizations including public health, and at pharmaceutical consulting companies. Dr. Aggarwal's expertise includes occupational and environmental health, exposure assessments, healthcare data analytics, biomarker research, cancer biology, cellular and molecular biology. Dr. Aggarwal published several peer-reviewed papers in academic journals, such as, the Nature, Development, Occupational and Environmental Medicine, Journal of Occupational Health, and Oncology Research. Previously, Dr. Aggarwal served as the Head of the Environmental Carcinogen Unit and Assistant Director in an occupational health institute, the Co-Chair for the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 8th Asia-Pacific Conference (Tokyo), the Chair of ISPOR Asia Consortium Education Committee, a TEDMED Scholar for TED Talks, the Co-Editor (2015-17) for News Across Asia - an ISPOR Newsletter, and as a Healthcare Industry Expert for the Sustainability Accountability Standard Board, USA. Currently, Dr. Aggarwal is an active member of the ISPOR and the Council of State and Territorial Epidemiologists (CSTE) and serves on ISPOR task forces and CSTE subcommittees on occupational and environmental health. Dr. Aggarwal also serves as a reviewer for several environmental and occupational health and public health journals such as, Toxicology and Industrial Health, Toxicology and Applied Pharmacology, Journal of Environmental Health Research, Value in Health, and the WHO Health Bulletin. Dr. Bhagwan Aggarwal is graduated with a Ph.D. (Cancer Biology) from Jawaharlal Nehru University, New Delhi (India), an MBA (Marketing & Finance) from Drexel University, Philadelphia (USA), and a M.Sc. (Biotechnology) from University of Pune, Pune, India. Dr. Aggarwal did post-doctoral research at University of Pennsylvania and Thomas Jefferson University, Philadelphia, and recently, he got board Certified in Public Health from the National Board of Public Health Examiners, Washington, DC (USA).

George A. Allen

Northeast States for Coordinated Air Use Management (NESCAUM)

Mr. George Allen is the Chief Scientist at the Northeast States for Coordinated Air Use Management (NESCAUM), an interagency association of the eight Northeastern States. He holds a B.S. in Electrical Engineering from Tufts University. At NESCAUM, Mr. Allen is responsible for monitoring and exposure assessment activities across a range of wide range of air topics, including regional haze, air toxics, on and off-road diesel, wood smoke, and continuous aerosol measurement technologies. He served on the Chartered Clean Air Scientific Advisory Committee (CASAC) from 2010 to 2016, has been a member of several CASAC review panels since 2004 including the disbanded 2016 particulate matter (PM) panel, and is the author or co-author of more than 45 peer-reviewed journal papers on development and evaluation of measurement methods, exposure assessment, and air pollution health effects. In October 2019, Mr. Allen participated in the Independent PM review Panel, a group of scientists dismissed by the Environmental Protection Agency (EPA) in the fall of 2018 that performed a parallel review of the science behind the PM standards. Before joining NESCAUM in 2002, Mr. Allen was on the professional staff at the Harvard School of Public Health (HSPH) in Boston for more than 20 years, working on a wide range of air pollution studies, funded by EPA and the National Institutes of Health. While at HSPH, he developed several new techniques for real-time aerosol measurements. Currently, Mr. Allen is serving as the lead for the NESCAUM Monitoring and Assessment Committee. He also represents states interests to EPA in the National Association of Clean Air Agencies (NACAA) Monitoring Steering Committee, and is a member of the Environmental Protection Agency (EPA) AIRNow Steering Committee. Mr. Allen's current and pending research support pertains to scientific, technical, analytical, and policy support for NESCAUM states' air quality and climate programs, with a focus on air pollution exposure assessment and measurement methods development. These funders include New York State Energy Research and Development Authority (NYSERDA) (characterization of biomass air pollution), Massachusetts Department of Environmental Protection (spatial and temporal trends of black carbon), NESCAUM member states and Federal Land Managers (CAMNET visibility network), NESCAUM member states and EPA (support of member states' air quality programs).

Ed Avol

University of Southern California

Mr. Ed Avol is Professor and Chief in the Environmental Health Division, Department of Population and Public Health Sciences in the Keck School of Medicine at University of Southern California (USC). He was formally trained as an environmental engineer, earning a Master of Science degree from the California Institute of Technology (Caltech) in 1974 under Dr. Sheldon Friedlander. His professional career has bridged both exposure and health assessment. He worked for two years as an environmental engineer on various EPA and California Air Resources Board (CARB) funded projects for Rockwell International from 1974 to 1976, participated and led research in human clinical studies under Dr. Jack Hackney at Rancho Los Amigos Medical Center for 14 years from 1976 to 1990, worked for two years as an environmental consultant leading air toxics health assessments and assorted research, then was recruited by USC to help design, develop, and perform the Children's Health Study (CHS). He has continued to be involved with the family of CHS studies since its inception. He has been at USC for 30 years involved in population-based chronic health effects research and teaching students about environmental health. His areas of expertise are (1) ambient air exposure assessment of particles and gases and (2) respiratory impacts (short and long-term) of inhalation of various pollutants, especially ozone and PM. His research funding over the past two years has been primarily through the National Institutes of Health (NIH) – specifically through the National Institute of Environmental Health Sciences - directing Exposure Core services for researchers through a National Center. He has previously served on Clean Air Scientific Advisory Committee (CASAC) expert panels for earlier reviews of ozone, nitrogen and sulfur oxides, and PM (during the Bush and Obama Administrations). He is a member of the International Society of Exposure Science (ISES) and was awarded the Constance Mehlman Award in 2017 for research and a career that helped shaped state and national policy on exposure reduction. He has also served on a number of regional and state committees associated with outdoor air pollution exposure and potential health impacts, and has been an advisor to several other universities' NIH-funded research centers.

James Boylan

Georgia Department of Natural Resources

Dr. James Boylan is currently the Manager of the Planning & Support Program in the Air Protection Branch of the Georgia Environmental Protection Division. The Planning & Support Program includes the Data & Modeling Unit (DMU), Emissions & Control Strategies Unit (ECSU), and Planning & Regulatory Development Unit (PRDU). Dr. Boylan's team is responsible for air dispersion modeling with American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) and California Puff Model (CALPUFF) required for Prevention of Significant Deterioration (PSD) permit applications covering sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), particulate matter with a diameter of less than 2.5 microns (PM_{2.5}), and lead (Pb); photochemical grid modeling with Community Multiscale Air Quality Model (CMAQ) and Comprehensive Air Quality Model with extensions (CAMx) required for Georgia's ozone, PM_{2.5}, and regional haze State Implementation Plans (SIPs); meteorological modeling with the fifth-generation Pennsylvania State University & National Center for Atmospheric Research Mesoscale Model (PSU/NCAR MM5) and Weather Research and Forecasting model (WRF); emissions modeling with Sparse Matrix Operator Kernel Emissions model (SMOKE) and Motor Vehicle Emission Simulator (MOVES); the development of annual state-wide emission inventories for criteria pollutants; and the technical analyses for nonattainment area designation recommendations (ozone, PM_{2.5}, lead, SO₂, NO₂). In addition, he is responsible for updating Georgia's Rules for Air Quality Control and developing and submitting all attainment demonstration State Implementation Plans (SIPs), infrastructure SIPs, and rule revision SIPs to Environmental Protection Agency (EPA). He has a B.S. in Chemical Engineering from the University of Notre Dame, a M.S. in Chemical Engineering from Auburn University, and a M.S. and Ph.D. in Environmental Engineering from the Georgia Institute of Technology. Dr. Boylan's Ph.D. research included the development of the Urban-to-Regional Multiscale 1 Atmosphere Model (URM-1ATM) which was the first comprehensive three-dimensional Eulerian photochemical grid model that included full ozone chemistry, heterogeneous sulfate chemistry, aerosol thermodynamics, wet deposition and scavenging, and the decoupled direct method (DDM) for ozone and particulate matter. This model was applied as part of the Southern Appalachian Mountain Initiative (SAMI) to simulate 1-hour maximum ozone, W126 ozone, speciated PM_{2.5}, acid deposition (ANC), and regional haze. In 2002, he was awarded the "Outstanding Ph.D. Thesis Award" for the best Ph.D. dissertation in the Georgia Tech School of Civil and Environmental Engineering. Later, he developed and published the first model performance goals and criteria for PM_{2.5} which has become the benchmark for most PM_{2.5} modeling projects both nationally and internationally. Dr. Boylan was one of the first modelers to merge traditional air permit dispersion modeling with photochemical grid models (PGMs) when he applied a PGM to evaluate the single source impacts on ozone and secondary PM_{2.5} from a coal-fired power plant as part of a PSD permitting review in 2009. In addition, he developed the "Inter-Pollutant Trading Ratio Approach" for accounting for secondary PM_{2.5} formation from SO₂ and NO_x in EPA's AERMOD steady-state dispersion model. Over the past several years he has held leadership positions within many regional and national workgroups. Dr. Boylan has authored or co-authored over 30 peer-reviewed journal articles and conference papers on ozone and PM_{2.5}, has presented research findings at over 150 national, regional, and local conferences/meetings, and was awarded "Outstanding Reviewer Status" by Atmospheric Environment in 2015. In 2001, Dr. Boylan was inducted into the Sigma Xi Scientific Research Honor Society. In 2014, Dr. Boylan was selected to participate in the Clean Air Scientific Advisory Committee (CASAC) review panel for the primary SO₂ NAAQS. In 2017, he was appointed by the EPA Administrator to serve on the chartered CASAC where he reviewed EPA documents for the most recent ozone and PM National Ambient Air Quality Standards (NAAQS). He was assigned as lead reviewer on multiple chapters and appendixes related to measurements, emissions, and modeling. In December 2020, Dr. Boylan published a paper titled "CASAC Review of the PM and Ozone NAAQS" in EM - The Magazine for Environmental Managers where he compared the traditional CASAC review approach to the newly implemented streamlined approach. Finally, Dr. Boylan was one of eight people selected to serve on the SAB Reduced Forms Tools (RFT) review panel in 2020.

Judith C. Chow

Desert Research Institute

Dr. Judith Chow holds the Nazir and Mary Ansari Chair in Science and Entrepreneurialism and is a Research Professor in the Division of Atmospheric Sciences at the Desert Research Institute (DRI), Nevada System of Higher Education in Reno, Nevada. She has led DRI's Environmental Analysis Facility since its inception in 1985. Dr. Chow earned a B.S. degree in Biology from Fu-Jen Catholic University in Taiwan (1974), a M.S. degree in Environmental Health Science (1983) from Harvard University, and a Sc.D. degree in Environmental Science and Physiology (1985) from Harvard University. For nearly 45 years, she has conducted air quality and source characterization studies and performed data analysis and receptor modeling to improve understanding of how air quality affects human health, visibility, historical treasures, ecosystems, and climate. Dr. Chow is currently the principal investigator for: 1) measuring organic and black carbon concentrations for the National Park Service's Interagency Monitoring of Protected Visual Environments (IMPROVE) network; 2) tracking changes in air quality with control measures at the ports of Los Angeles and Long Beach; and 3) investigating the chemical nature and composition of atmospheric brown carbon aerosol. She has been principal investigator or a major collaborator in more than 50 large air quality studies (and many smaller ones) across the United States and in other countries. Dr. Chow prepared and revised sections of EPA's Particulate Matter (PM) Criteria Document (in the late 1990s/early 2000s) pertaining to chemical analysis and source emissions and contributed to EPA guidance documents on network design, continuous particulate monitoring, and particulate matter chemical speciation. Her research has been sponsored by grants and contracts from the federal government (e.g., EPA, Department of Energy and Department of Interior), local, state, and international air quality management authorities, industry, and the National Science Foundation. As past chair and a member of the Air & Waste Management Association's (A&WMA) Critical Review Committee, Dr. Chow has coordinated and evaluated Critical Reviews and Discussions on environmental science and technology topics. She was chair of the Publications Committee for the Journal of the Air & Waste Management Association and serves on Editorial Boards and/or as Associate Editor for several international journals including: the Journal of Air Quality, Atmosphere, & Health, Aerosol and Air Quality Research, Atmospheric Pollution Research, and Particuology. Dr. Chow was a member of the National Research Council's (NRC) committees on Research Priorities for Airborne Particulate Matter (1998&2003) and Energy and Air Pollution Futures in the U.S. and China (2004-2008); she also served on the NRC Board on Environmental Studies and Toxicology (2002&2005). She has been a member of the technical advisory group for the South Coast (California) Air Quality Management District's Multiple Air Toxics Exposure Study (MATES) since 1998. Dr. Chow was a chartered member of EPA's Clean Air Scientific Advisory Committee (CASAC) (2015-2018) and CASAC's Air Monitoring and Methods Subcommittee (AMMS, formerly the Ambient Air Monitoring and Methods Subcommittee) (2004-2019). She is the principal author or co-author of >590 peer-reviewed articles and book chapters and >260 reports. She has been recognized by ISI HighlyCited.com in ecology and environment with more than 27,725 citations and an h-index of 82, and is one of Stanford University's "Top 2% of the Worlds' Most Cited Scientists."

Owen Cooper

University of Colorado Boulder

Dr. Owen R. Cooper received his M.S. and Ph.D. from the Department of Environmental Sciences at the University of Virginia in 1997 and 2001, respectively, focusing on the long-range transport of ozone and ozone precursors across North America, and their export over the North Atlantic Ocean. In 2001 he became a National Research Council Associate at the National Oceanic and Atmospheric Administration (NOAA) Aeronomy Laboratory in Boulder, Colorado, and the following year he joined the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder. Since then, Dr. Cooper (now a CIRES Senior Research Scientist) has worked closely with federal scientists at the NOAA Chemical Sciences Laboratory to understand the intercontinental transport of air pollutants, natural production of ozone from lightning and stratospheric intrusions, the impact of weather and climate on surface ozone pollution, and the national and global scale distribution and trends of ozone at the surface and in the free troposphere. Dr. Cooper regularly contributes to the writing of assessment reports, with a focus on tropospheric ozone: 1) since 2012, he has worked with Dr. J. Ziemke (Morgan State University/ National Aeronautics and Space Administration Goddard Space Flight Center) to update the summary of tropospheric ozone trends in the annual State of the Climate reports (led by NOAA and published in the Bulletin of the American Meteorological Society); 2) he was a contributing author on global tropospheric ozone trends to the fifth and sixth Intergovernmental Panel on Climate Change (IPCC) Assessment Reports; 3) in 2014 he initiated the Tropospheric Ozone Assessment Report (TOAR), an Activity of the International Global Atmospheric Chemistry Project (IGAC), and has continued to lead TOAR as co-chair. Recently, Dr. Cooper has contributed to the efforts by Global Burden of Disease (GBD) to estimate global human mortality due to long-term ozone exposure. This GBD team produced detailed global ozone exposure maps built from a fusion of output from an ensemble of atmospheric chemistry models and all available surface ozone observations (compiled by TOAR). Dr. Cooper's leadership role in global ozone research now includes his service as chairperson of the World Meteorological Organization's Scientific Advisory Group on Reactive Gases, and his recent appointment to the IGAC Scientific Steering Committee. Dr. Cooper has a total of 118 peer-reviewed publications (22 as first author) with an h-index of 57, as compiled by Web of Science (ResearcherID: H-4875-2013; ORCID: 0000-0001-7391-1161). Over the past two years, Dr. Cooper's research funding has been entirely supported by the NOAA Cooperative Agreement with CIRES, NA17OAR4320101.

Angela Dickens

Lake Michigan Air Directors Consortium

Dr. Angela Dickens is the Data Scientist at the Lake Michigan Air Directors Consortium (LADCO), the multijurisdictional organization for air quality in the Great Lakes region. Prior to her position at LADCO, she worked as an Air Policy Analyst with the Wisconsin Department of Natural Resources (WI DNR). She also served in the U.S. Environmental Protection Agency (EPA) Office of Transportation and Air Quality as a Science Policy Fellow and at Mount Holyoke College as an Assistant Professor of environmental chemistry. She has a Ph.D. in chemistry from the University of Washington and a B.A. in chemistry from Carleton College. Dr. Dickens is one of the leading experts on ozone formation, transport, and distribution in the Great Lakes region. At LADCO, she generates and synthesizes evidence about the meteorological and chemical drivers of tropospheric ozone at the land-water interface and in the Great Lakes region in general. She works with the states in the region to understand the anticipated impacts of potential ozone precursor emissions reductions. Dr. Dickens is currently analyzing the ozone-NOx-VOC chemistry in the region using data from models, satellites and ground-based monitoring networks to help state air quality planners design ozone attainment demonstrations for their state implementation plans (SIPs). She was one of the initiators and lead organizers of the 2017 Lake Michigan Ozone Study (LMOS 2017), a collaborative, multi-agency research and field study of ozone in the Lake Michigan region involving National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), EPA and university scientists. She is also collaborating with researchers on the 2021 Michigan-Ontario Ozone Source Experiment (MOOSE). Dr. Dickens is involved with two NASA Health and Air Quality Applied Sciences Team (HAQAST) Tiger Teams and collaborates with researchers on several other NASA- and LADCO-funded projects. While at WI DNR, she was the staff lead on Wisconsin's SIP for ozone, which involved extensive work implementing EPA's National Ambient Air Quality Standard (NAAQS) for ozone. In this role, she drafted state comments on proposed NAAQS rules, attainment demonstrations, redesignation requests, designation recommendations and other policy documents. She is the author or co-author of 20 published research papers in two fields: air quality science and organic geochemistry. Dr. Dickens also has considerable expertise in greenhouse gas emissions lifecycle analyses of biofuels and in the global carbon cycle. Dr. Dickens's funding at LADCO comes from the LADCO member states and EPA, which supports member states' air quality programs. While at WI DNR, she was funded by the state air management program.

Emmi Felker-Quinn

National Park Service

Dr. Emmi Felker-Quinn earned a Ph.D. in Ecology and Evolutionary Biology from the University of Tennessee. She was a post-doctoral fellow with the U.S. Environmental Protection Agency National Center for Environmental Assessment, where she authored sections of the Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter and the ISA for Ozone. She joined the Air Resources Division (ARD) of the National Park Service in 2019. As an ARD ecologist, Dr. Felker-Quinn provides expertise to parks on the impacts of nitrogen, sulfur, and ozone on terrestrial and aquatic natural resources. She also collaborates with park and university partners to conduct research on the impacts of air pollution within parks. Dr. Felker-Quinn currently serves as co-chair of the Critical Loads of Atmospheric Deposition Scientific Committee of the National Atmospheric Deposition Program.

Mark W. Frampton

University of Rochester Medical Center

Dr. Mark W. Frampton is Professor Emeritus in Medicine in the Pulmonary and Critical Care division, at the University of Rochester Medical Center. Dr. Frampton holds an M.D. from New York University. His research career has been devoted to understanding the human health effects of exposure to air pollution, using human clinical studies. His work extends beyond pulmonary function effects to include airway inflammation, host defense, and cardiovascular effects. Dr. Frampton's laboratory was the first to conduct human clinical studies of ultrafine particles (smaller than 100 nm) and is one of three centers completing a joint study of the cardiovascular effects of ozone exposure in healthy older subjects, funded by the Health Effects Institute (HEI). Overall, these studies have helped to understand the physiological changes and pathways to adverse effects from air pollutant exposure, and have informed the Environmental Protection Agency (EPA) promulgation of rational ambient air quality standards. Funding for these studies has come from the National Institutes of Health (NIH), the EPA, HEI, and others. Dr. Frampton has served on numerous scientific review panels for the NIH, EPA, and other scientific funding organizations. He has served as Chair of the Environmental and Occupational Health Assembly of the American Thoracic Society, chaired a Task Force on Bioterrorism, and served as the first Chair of the Section on Bioterrorism. Dr. Frampton is a former member of the Science Review Committee for HEI. He participated in an HEI review panel on the health effects of traffic-related air pollution, and chaired an HEI Review Panel on ultrafine particles, which produced a recent HEI Perspectives, "Understanding the Health Effects of Ambient Ultrafine Particles." Dr. Frampton has served as a consultant to the EPA in developing and reviewing Integrated Scientific Assessments for criteria pollutants. He served as a member of the Chartered Clean Air Scientific Advisory Committee (CASAC) from 2018 & 2021, participating in reviews of the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM) and ozone.

Christina H. Fuller

Georgia State University School of Public Health

Dr. Christina H. Fuller is an Associate Professor of Environmental Health at the Georgia State University School of Public Health. Dr. Fuller received her M.S. degree and Sc.D. degree in Environmental Health from the Harvard School of Public Health and her B.S. degree in Environmental Engineering from Northwestern University. Dr. Fuller has been active in the air pollution field for over 15 years and specializes in human exposure assessment, epidemiology, health disparities and community-based research. Her expertise includes the characterization of criteria air pollutants, as well as extensive knowledge of ultrafine particles; estimating cardiovascular health effects; documenting disparities and social vulnerabilities; and testing exposure reduction technologies. Dr. Fuller has served on review panels for the National Institute of Environmental Health Sciences (NIEHS), the Health Effects Institute and the Natural Environment Research Council (United Kingdom). She is an Editorial Board Member of the International Journal of Environmental Research and Public Health (IJERPH) and is currently editing a special issue on air pollution within Africa and the African Diaspora. Dr. Fuller recently released a co-edited book titled Ambient Combustion Related Ultrafine Particles and Health, which compiles the state of the science of the very smallest particles. Within the past two years, Dr. Fuller has served as Principal Investigator (PI) of an NIEHS-funded research grant testing the effectiveness of air pollution mitigation through green infrastructure. In addition, she served as PI on a community-engaged research project measuring air pollution near marine ports funded by New York Community Trust/Friends of the Earth. She teaches courses on air pollution, environmental justice, and environmental health to both undergraduate and graduate students. Dr. Fuller is a member of the International Society of Environmental Epidemiologists (ISEE) and its Capacity Building and Education Subcommittee; the International Society of Exposure Science (ISES) and its 2021 Technical Organizing Committee; and the American Public Health Association.

Terry Gordon

New York University School of Medicine

Dr. Terry Gordon holds the rank of Professor of Environmental Medicine at the New York University (NYU) School of Medicine. He holds a B.S. in Physiology, an M.S. in Toxicology from the University of Michigan, and a Ph.D. in Toxicology from Massachusetts Institute of Technology (MIT), and was appointed to the faculty of the Department of Environmental Medicine in 1989. He has served as an ad hoc member of grant review panels and/or site visit teams for National Institute of Environmental Health Sciences (NIEHS), National Institute of Allergy and Infectious Diseases (NIAID), National Coalition for Cancer Research, Department of Defense (DOD), Bureau of Mines, National Aeronautics and Space Administration (NASA), Health Canada, National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), and the Environmental Protection Agency (EPA). Dr. Gordon is past Chair of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) committee, a volunteer organization that publishes occupational exposure levels that are used as workplace safety guidelines throughout the world. Dr. Gordon's broad research interest is in inhalation toxicology. The major focus of his research lab is the identification and understanding of the role of susceptibility factors in the pathogenesis of the adverse pulmonary effects produced by inhaled environmental and occupational agents. Because inter-individual responses to inhaled particles and gases vary so greatly in both human subjects and test animals, Dr. Gordon has hypothesized that genetic, age, and sex susceptibility factors play a major role in environmental and occupational lung disease. Dr. Gordon also plays a major role in the particulate matter (PM) research program at NYU, and was among the first researchers to use concentrator technology to study the adverse cardiopulmonary effects of ambient PM. Dr. Gordon is an active member of the Society of Toxicology (SOT), and has served on the Program, Placement, Membership, and Awards Committees and as President of its Inhalation Specialty Section. He has served as a consultant/author to the EPA on issues of pulmonary toxicology related to the development of various documents, and served on EPA's Clean Air Scientific Advisory Committee (CASAC) Oxides of Nitrogen (NOx), PM, and Sulfur Oxides (SOx) Primary National Ambient Air Quality Standards (NAAQS) Review Panels. Dr. Gordon's current research, supported by National Heart, Lung, and Blood Institute (NHLBI), NIEHS, and National Cancer Institute (NCI), examines the adverse health effects of alternative tobacco products and underground subway air pollution. He is also the Director of NYU's NIEHS-supported Training Grant in Environmental Toxicology.

Nancy Grulke

United States Department of Agriculture (USDA) Forest Service

Dr. Nancy Grulke is a research scientist employed by the United States Department of Agriculture (USDA) Forest Service over the last 35 years. She received a B.Sc., Honors, in Botany from Duke University (1978) and a Ph.D. in Botany from the University of Washington (1983), with a focus on ecology and physiology. Her research experience of interest to this panel includes establishing thresholds of deleterious levels of different metrics of O₃ (dose, exposure, foliar uptake) to provide data to establish a secondary air quality standard, with considerations for antioxidant defense capacity in mature, non-agricultural species of pines, mature evergreen and deciduous oaks, and sensitive herbaceous species, as well as agricultural species (tomato, snapbean, soybean, sugar cane, cotton, and weeds in agricultural fields). Modification of plant response to O₃ by concurrent elevated CO₂, soil nitrogen, and physiological drought stress have been of particular focus in my research on plant carbon and water balance. Dr. Grulke designed, built, and employed a novel gas exchange system to directly and concurrently measure CO₂ and O₃ uptake, and water loss from foliage, which permitted analysis of steady state vs. kinetic responses to these stressors (O₃, drought) or growth enhancers (CO₂, N deposition) in mature trees. She contributed to the Environmental Protection Agency (EPA) Criteria Document in 1996 (plants) and 2006 (terrestrial ecosystems). Her research has been supported internally by the USDA Forest Service over the last 13 years, and prior to that by EPA and USDA National Institute of Food and Agriculture (NIFA) grants. She has worked with EPA, California Air Resources Board, and has been a member of USDA NE1013 working group on O₃ effects. Dr. Grulke is a member of the Society of American Foresters, and previously the Ecological Society of America, American Association of Plant Physiologist, and AAAS. She was an office holder in the International Union of Forest Research Organizations (IUFRO) Working Group 7.0 and chair of the Air Pollution Workshop.

Philip Hopke

Clarkson University

Dr. Philip K. Hopke is the Bayard D. Clarkson Distinguished Professor Emeritus at Clarkson University and an adjunct professor in the Department of Public Health Sciences at the University of Rochester Medical Center. He holds a B.S. in Chemistry from Trinity College, Hartford, CT, and an M.A. and Ph.D. in Chemistry from Princeton University. His research interests include: Chemical characterization of ambient aerosol samples; Characterization of source/receptor relationships for ambient air pollutants; Multivariate statistical methods for data analysis; Indoor air quality; Exposure and risk assessment; Emissions and properties of solid biomass combustion systems; and Experimental studies of homogeneous, heterogeneous, and ion-induced nucleation. Dr. Hopke is the past Chair of the Environmental Protection Agency (EPA) Clean Air Scientific Advisory Committee (CASAC), and has previously served on the EPA Science Advisory Board. Professor Hopke is a Past President of the American Association for Aerosol Research (AAAR), was a member of the more than a dozen National Research Council committees, and on their Board of Environmental Studies and Toxicology. He is a fellow of the International Aerosol Research Assembly (IARA), the American Association for the Advancement of Science, the American Association for Aerosol Research, and the Air and Waste Management Association. He is an elected member of the International Statistics Institute and the recipient of the two major international awards in chemometrics. Dr. Hopke is also a recipient of the AAAR David Sinclair Award and the IARA Fissan-Pui-TSI Award for International Research Collaboration. He served as a Jefferson Science Fellow at the U.S. Department of State during the 2008-09 academic year. He has been appointed to World Health Organization (WHO) Global Air Pollution and Health & Technical Advisory Group (GAPH-TAG) Expert Working Group on Interventions / Policies and the Expert Working Group on Methodologies for Source-Specific Burden of Disease. His current EPA funding is the Great Lakes Fish Monitoring and Surveillance Program that examines the presence of legacy and emerging contaminants in Great Lakes fish. He also has funding from the New York State Energy Research and Development Authority (NYSERDA) to analyze air pollution data from New York State. He is part of two Health Effects Institute (HEI) projects looking at particulate pollution and health outcomes in China and the U.S. and project looking at particulate pollution and fetal development, funded by the National Institute of Environmental Health Sciences.

Daniel Jacob

Harvard University

Dr. Daniel J. Jacob is the Vasco McCoy Family Professor of Atmospheric Chemistry and Environmental Engineering in the School of Engineering & Applied Science at Harvard University. He received his B.S. (1981) in Chemical Engineering from the Ecole Supérieure de Physique et Chimie Industrielles (ESPCI), and his Ph.D. (1985) in Environmental Engineering from Caltech. His research covers a range of topics in atmospheric chemistry. He has led the development of the GEOS-Chem global/regional 3-D model of atmospheric composition, has served as Mission Scientist on eight National Aeronautics and Space Administration (NASA) aircraft missions, is a member of several satellite Science Teams, and leads a Samsung Strategic Research Program on particulate matter (PM) air quality in East Asia. His research is funded by NASA, National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), United Nations Environment Programme (UNEP), Samsung, and NUIST. He is Model Scientist for GEOS-Chem and chairs the National Center for Atmospheric Research (NCAR) Atmospheric Chemistry Observations & Modeling (ACOM) Modeling Advisory Board. He led the NASA Air Quality Applied Sciences Team from 2011 to 2016. Jacob has about 500 peer-reviewed publications (H-Factor of 134 according to Web of Science) and trained over 100 Ph.D. students and postdocs over the course of his career.

Catherine J. Karr

University of Washington

Dr. Catherine Karr is a Professor at the University of Washington (UW) with a joint appointment in the Department of Pediatrics and the Department of Environmental & Occupational Health Sciences. She is also Adjunct Professor in the Department of Epidemiology. She has a Master's degree in Environmental Health/Toxicology and Ph.D. in Epidemiology from the University of Washington. She is also an MD (UW Medical School) and Board Certified Pediatrician (Residency, UW-Seattle Children's Hospital). Dr. Karr is a recognized pediatric environmental health and medicine leader. She received the Presidential Early Career Award for Scientists and Engineers (PECASE) Awardee in 2017 and was profiled the Lancet in 2018 for her accomplishments. Her specialty areas of interest include indoor and outdoor air pollution including wildfire smoke, community engaged research practice, pediatric respiratory disease and working with underserved communities including children in low- and middle-income countries. She served on the American Academy of Pediatrics Council of Environmental Health Executive Committee, 2005-2011. She is co-lead author on the 2021 American Academy of Pediatrics policy statement on air pollution. She has been Director of the Centers for Disease Control and Prevention (CDC)/ Environmental Protection Agency (EPA) sponsored Northwest Pediatric Environmental Health Specialty Unit since 2004, National Institute of Environmental Health Sciences (NIEHS) P30 Center Clinical & Translational Science Unit Lead since 2015, and member of the Pacific Northwest Center for Agricultural Safety and Health Internal Advisory Team since 2011. She is the DSMB Chair of the Gates Foundation/ National Institutes of Health (NIH) supported multi-nation global cooking fuel intervention trial (HAPIN Trial). Dr. Karr served on the EPA Chartered Science Advisory Board from 2012 -2019 and was an EPA Star grantee (2016-2020). In addition to her largely NIH supported research program, she maintains a regular pediatric primary care practice at UW Medicine Roosevelt Primary Care Center and sees specialty environmental medicine consult patients in this setting.

Michael T. Kleinman

University of California, Irvine

Dr. Michael T. Kleinman is an Inhalation Toxicologist and Professor in the Department of Environmental and Occupational Health in the University of California, Irvine (UCI) College of Health Sciences, with joint appointments in the Department of Medicine and the Program in Public Health. He was previously an environmental scientist for the U.S. Atomic Energy Commission (AEC) and the director of the Aerosol Exposure and Analytical Laboratory at Rancho Los Amigos Hospital in Downey, CA. He holds a M.S. in Chemistry (Biochemistry) from the Polytechnic Institute of Brooklyn and a Ph.D. in Environmental Health Sciences from Institute of Environmental Medicine of New York University. He currently is the Co-Director of the Air Pollution Health Effects Laboratory at UCI. He has published more than 145 peer-reviewed journal articles on effects of environmental contaminants on cardiopulmonary and immunological systems and on global and regional distribution of toxic environmental materials including heavy metals and radioactive contaminants from nuclear weapons testing. His current research focuses on the effects of inhaled particles on the heart and brain to develop better understanding how these effects are mediated by toxic metals, organic constituents and elemental carbon components of inhaled substances. Funding for Dr. Kleinman's research is from grants from the California Health Effects of Air Pollution Foundation, the California Air Resources Board and the National Institutes of Health. Dr. Kleinman has served on several Clean Air Scientific Advisory Committee (CASAC) panels (Particulate Matter, Ozone, Nitrogen Oxides) and is a member of the Environmental Protection Agency (EPA) Board of Scientific Counselors Air and Energy (AE) Subcommittee, has formerly served on the STAA panel, is a member of the Scientific Review Panel for Toxic Substances for the state of California and is the Vice-Chair of the Science Advisory Council for the Bay Area Air Quality Management District.

Sabine Lange

Texas Commission on Environmental Quality

Dr. Sabine Lange is the section manager for the Toxicology, Risk Assessment, and Research Division at the Texas Commission on Environmental Quality (TCEQ). Dr. Lange's responsibilities include overseeing health effects risk assessments of air permit applications, ambient air monitoring projects, and hazardous waste sites; overseeing the development of chemical toxicity factors; and conducting and overseeing systematic reviews and independent analyses of risk assessments. Dr. Lange serves as a technical resource for the State and citizens of Texas for human health and environmental risk assessment, especially related to air and water quality. Dr. Lange's research interests include the toxicology and risk assessment of criteria air pollutants, and risk assessment methods used for derivation of toxicity factors. In these areas she has published articles, given invited talks, presented posters, and served as a workshop panel member. On behalf of the TCEQ, Dr. Lange has intensively reviewed the documents released by the U.S. Environmental Protection Agency (EPA) on the National Ambient Air Quality Standards (NAAQS) for ozone, particulate matter, sulfur dioxide, nitrogen dioxide, and lead. She is also a former member of the U.S. EPA's chartered Clean Air Scientific Advisory Committee (CASAC), and she has served as a peer reviewer for EPA on a Science Advisory Board panel reviewing an EPA report on reduced form tools for estimating air quality benefits, as well as on a panel reviewing chemical hazard assessments for regulations under the Toxic Substances Control Act. Dr. Lange's work since joining TCEQ has been entirely funded by the State of Texas. Dr. Lange received a Bachelor's degree in biochemistry from the University of Western Ontario in Canada, and completed a Ph.D. and post-doctoral training in biochemistry and molecular carcinogenesis at the University of Texas at Houston and MD Anderson Cancer Center. Dr. Lange is a Diplomate of the American Board of Toxicology.

Danica Lombardozzi

National Center for Atmospheric Research

Dr. Danica Lombardozzi is a Project Scientist in the Terrestrial Sciences Section of the Climate and Global Dynamics (CGD) Laboratory at the National Center for Atmospheric Research (NCAR). She received her Ph.D. from Cornell University in Ecology and Evolutionary Biology and her B.A. from Colorado College in Environmental Science. Dr. Lombardozzi is a global change ecologist and her work uses a combination of ecological observations and global-scale models to investigate how terrestrial ecosystems are changing in response to human activities, with a major focus on the detrimental impacts of ground-level ozone on terrestrial ecosystems from leaf to global scales. She is co-founder of the Ozone Bioindicator Garden Network which aims to educate the public about the impacts of air pollution, and leads the citizen science data collection at gardens throughout the network to improve our understanding about the development of visible foliar damage. Dr. Lombardozzi serves as the chair of the Community Land Model Agriculture Working Group, is on the International Evaluation Board for the Norwegian Climate School, and is on the Curriculum Committee for Flux Course. Dr. Lombardozzi is a member of the American Geophysical Union and has received funding from the National Science Foundation and the US Department of Agriculture for her work.

Huiting Mao

State University of New York - College of Environmental Science and Forestry

Dr. Huiting Mao is currently a professor with the Department of Chemistry at the State University of New York College of Environmental Science and Forestry. She obtained her Ph.D. in Atmospheric Sciences from the State University of New York at Albany, a M.S. in Atmospheric Sciences from the Institute of Atmospheric Physics of Chinese Academy of Sciences, and a B.S. in Atmospheric Sciences from Nanjing University, China. Her research interests include tropospheric chemistry, climate-air quality interactions, air quality and health impacts, intercontinental transport, and radiative transfer processes. In recent years she has been collaborating with colleagues at Nanjing University and Shandong University to study air pollution in China. She and students and colleagues have published works on regional budgets of ozone and carbon monoxide, biogenic and anthropogenic contributions to methanol and acetone in marine and terrestrial environments, impacts of synoptic to hemispheric circulation on surface ozone at midlatitudes, continental outflow using airborne and satellite measurements, factors important to speciated mercury levels in various environments, causes for occurrence of atmospheric mercury depletion events in the springtime Arctic, and assessments of present and future climate and air quality. She has also co-authored on a wide range of topics such as discovering a large terrestrial source of methyl iodide, global distribution of mercury in the troposphere using airborne measurements, and distributions of hydrocarbons and halocarbons along coastal New England. She and her group are currently studying the impact of ozone on ecosystems and budgets of atmospheric nitrous acid. Her research during the last two years (2019 – 2021) were supported by the National Science Foundation, the National Park Service, and the New York State Energy Research and Development Authority. Dr. Mao currently serves on the Environmental Protection Agency's Mercury in the Environment and Links to Deposition (MELD) Science Committee. She is a member of the American Geophysical Union (AGU) and the American Meteorological Society (AMS).

Charles (Tom) Moore

Western States Air Resources (WESTAR) Council - Western Regional Air Partnership (WRAP)

Mr. Charles Thomas (Tom) Moore, Jr. works for the Western States Air Resources (WESTAR) Council as manager of the Western Regional Air Partnership (WRAP) air quality program, a voluntary partnership of states, tribes, federal land managers, local air agencies and the U.S. Environmental Protection Agency (EPA), whose purpose is to understand current and evolving regional air quality issues for the western U.S. in the context of the federal Clean Air Act (CAA) and the National Environmental Policy Act. He is funded by western states, EPA, and the National Park Service. He manages diverse and complex regional analysis projects covering ambient monitoring data, emissions inventory preparation and analysis, regional photochemical grid modeling and source apportionment results, and satellite air quality data; in support of the needs of WESTAR-WRAP members' air quality management programs across the West. A principal emphasis of his work from 2002 to the present is support of Regional Haze planning for more than 100 Class I areas with the highest level of air quality protection under the CAA within the WESTAR-WRAP region. Key western U.S. air quality expertise includes extensive work with the activity and emissions estimation techniques for electrical generating units, wildland and agricultural fire emissions, and oil & gas exploration and production emissions. Regional modeling analyses are used to address planning requirements related to Regional Haze sources, transport, deposition, and tracking visibility improvement, as well as related similar issues for the Ozone National Ambient Air Quality Standards at various sources and scales. Mr. Moore has a B.S. in Physical Geography from Arizona State University in Tempe, with an emphasis on meteorological and glacier field studies, and climate data analysis projects, as well as additional graduate coursework related to air pollution and climate. He led a WESTAR project to advise EPA on western U.S. topics and issues with implementation of the national Particulate Matter health and welfare standards. He served on technical workgroups for the Grand Canyon Visibility Transport Commission and the Federal Advisory Committee Act's Committee for Development of Ozone, Particulate Matter and Regional Haze Implementation Programs. He was also a member of the Clean Air Scientific Advisory Committee - Particulate Matter Review Panel and an expert panel reviewing EPA's Report on the Environment. He is active in the Air & Waste Management Association (AWMA), organizing reviews and meetings, and publishing regularly for AWMA and other journals.

Howard Neufeld

Appalachian State University

Dr. Howard Neufeld is currently a Professor in the Department of Biology at Appalachian State University, Boone, NC. He received a B.S. in Forestry from Rutgers University in 1975, a M.F. in Forest Sciences from the Yale School of Forestry and Environmental Science in 1977, and a Ph.D. in Botany from the University of Georgia in 1984. After his first postdoctoral position at New Mexico State University, he began a National Research Council post-doctoral appointment under Drs. Dave Tingey and Bill Hogsett, at the Environmental Protection Agency (EPA) Lab in Corvallis, OR, where he worked on the effects of ozone on tree seedlings. Dr. Neufeld's research expertise is in the area of plant physiological ecology, including effects of pollution and climate change on plants and lichens, water relations of plants, adaptive responses by understory plants, and the role of anthocyanins in vegetative tissues of plants. He was principal investigator of a National Park-U.S. EPA sponsored research project on the effects of ozone on plants native to Great Smoky Mountains National Park. His most recent National Science Foundation grant was a multi-institutional effort to use research experiences in the classroom as a means to attract more students into the plant sciences. He has published over 45 papers and one book chapter, graduated 29 graduate students, seven of whom have completed their Ph.D. degrees at other institutions, and currently mentoring five more. He has served on National Park Service and EPA grant panels, and as a consulting member of the Clean Air Scientific Advisory Committee from 2009-2014. He is past-president of both the Association of Southeastern Biologists and The Southern Appalachian Botanical Society, and was the first Director of the Southern Appalachian Environmental Research and Education Center at Appalachian State University, a unit of the University's Research Institute for the Environment, Energy and Economics. He is a member of the following professional societies: Association of Southeastern Biologists, Southern Appalachian Botanical Society, Botanical Society of America, National Center for Science Education, and the Torrey Botanical Society. He is currently a handling editor for the journal *Frontiers in Plant Science* and a reviewer/editor for the journals *Science of the Total Environment* and *Plants*.

D. Warner North

NorthWorks

Dr. D. Warner North has enjoyed a career of more than fifty years with a main theme of characterizing uncertainty in the context of strategic decision making, both in a corporate and government policy context. While his professional employment has been with a series of consulting organizations, he has extensive experience serving on EPA's Science Advisory Board and in assignments for the National Academies. Dr. North obtained a B.S. in physics from Yale before going to Stanford, where after two years and a M.S. in physics he switched to a new field. Lectures in the summer by visiting Harvard Professor Howard Raiffa stimulated his interest in decision analysis. He then did his Ph.D in decision analysis under Stanford Professor Ronald Howard, with guidance also from Robert Wilson, who last year was awarded the Nobel Prize in Economics. Dr. North joined Stanford Research Institute, later renamed SRI International, in 1967. He had key roles in a project for the Mexican Government that led to nuclear power plants in Mexico, a decision analysis of hurricane seeding that was presented to the President's Scientific Advisory Committee and published in *Science* in 1972, and analysis for National Aeronautics and Space Administration (NASA) of the probability of contaminating Mars from the Viking Mission in 1976. He was a consultant to a committee of the National Academy of Sciences on the report, *Air Quality and Stationary Source Emissions Control* (1975) and has served the National Academies on panels, committees, and boards, and as reviewer of reports. He served on the committees that produced *Risk Assessment in the Federal Government: Managing the Process* (1983), *Understanding Risk: Informing Decisions in a Democratic Society* (1996), and chaired the committee that produced *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Society and Technical Challenges* (2001). He was named a National Associate of the National Research Council in 2003. Dr. North was first appointed to a subcommittee of the EPA Science Advisory Board (SAB) in 1979 to review methods for dealing with uncertainty proposed by EPA's Office of Air Quality Planning and Standards. He has subsequently served on many SAB committees and panels, including subcommittees of the Clean Air Scientific Advisory Committee (CASAC). For a brief period in 2019 he was a non-member consultant to respond to questions from CASAC members on the Integrated Science Assessment and Policy Analysis documents for ozone and particulate matter. Dr. North was associated with the consulting firm Decision Focus Incorporated in Mountain View, CA from 1977 to 1998. He then established NorthWorks for his consulting work. Dr. North had appointments as adjunct faculty at Stanford University from 1976 to 2009. Dr. North joined the Society for Risk Analysis in 1983, served as its president in 1991-92, and as an area editor for its journal *Risk Analysis* from 2008 to 2021. He has served as edited special issues on air pollution risk and methodology for assessing risks and benefits in the context of regulatory policy. He has written book reviews on 20 books dealing with environmental risk and safety. Dr. North is semi-retired, with no current position other than NorthWorks, and no paid research or consulting work in the past two years, excepting an honorarium for service as area editor for *Risk Analysis*. The research and writing he has done in the past two years have been self-funded, excepting payment for time in 2019 as a non-member consultant to CASAC.

David Parrish

National Oceanic and Atmospheric Administration (Retired)

Dr. David Parrish's career has been at the National Oceanic and Atmospheric Administration (NOAA) in atmospheric chemistry research, primarily through surface and airborne measurement campaigns. For this work he was elected as a Fellow of the American Geophysical Union, for "pioneering research identifying effects of long-range transport on tropospheric ozone and effectively providing science for air quality decisions." His recent research focuses on U.S. background ozone concentrations, including quantifying the major contributions that background ozone makes to episodes when the National Ambient Air Quality Standards (NAAQS) is exceeded in U.S. urban areas. He is retired, working part-time under international academic appointments and as a consultant in atmospheric chemistry through David.D.Parrish, LLC. Research funding over the last two years has come from the U.S. Environmental Protection Agency (EPA) and US Bureau of Ocean Energy Management through Ambilabs, LLC. He has published over 240 peer-reviewed publications with over 17,500 citations, with an h-index of 81 (researcherid.com/rid/E-8957-2010). His recent science service activities include as a consultant in support of the Clean Air Scientific Advisory Committee (CASAC) 2020 review of particulate matter (PM) and ozone NAAQS, lead author of "Science Synthesis Report: Atmospheric Impacts of Oil and Gas Development in Texas" (2017), Science Review Group for Bureau of Ocean Energy Management funded Air Quality Modeling in the Gulf of Mexico Region, lead author of "Synthesis of Policy Relevant Findings from the CalNex 2010 Field Study" (2014), member of Independent Technical Advisory Committee of the Texas Air Quality Research Program (2010-2015), Coordinating Chapter lead author for 2011 Report "IGAC Assessment on Impacts of Mega-cities on Air Quality and Climate", Coordinating Chapter lead author for 2010 Report of Task Force on Hemispheric Transport of Air Pollutants (HTAP). He received his B.S. degree in chemistry from Colorado College in 1962, his Ph.D. in physical chemistry from University of California, Berkeley, California in 1970 and was a Postdoctoral Research Fellow at Harvard University from 1971-1973.

Jennifer Peel

Colorado State University

Dr. Jennifer L. Peel is a Professor and Section of Head of Epidemiology in the Department of Environmental and Radiological Health Sciences at Colorado State University (CSU). She also holds an appointment as a Professor in the Departments of Epidemiology and Environmental and Occupational Health in the Colorado School of Public Health. She holds a B.S. in Biochemistry and Molecular Biology from The Pennsylvania State University, and a Ph.D. and M.P.H. in Epidemiology from the Rollins School of Public Health at Emory University. Dr. Peel's research focuses on the health effects of air pollution, including ambient air pollution in the United States and household air pollution in low- and middle-income countries. She is currently one of three principal investigators (PIs) of the Household Air Pollution Intervention Network (HAPIN) trial, a multi-site randomized trial evaluating the impact of a liquefied petroleum gas stove and fuel intervention on exposure to air pollution and health across the lifespan among 3,200 households using biomass for cooking in Guatemala, India, Peru, and Rwanda. The trial, funded by the National Institutes of Health (NIH) and the Bill & Melinda Gates Foundation, is evaluating adverse birth outcomes, growth, cognitive development, and severe pneumonia among children, and indicators of chronic disease among older adult women, among other outcomes. Dr. Peel has also recently served as PI of two additional projects funded by NIH, one evaluating the emissions and acute health effects from emissions from household cookstoves and another evaluating exposures and acute health effects experienced while commuting by bicycle and by car. Dr. Peel is a member of the Review Committee for the Health Effects Institute, a standing member of the Infectious Disease, Respiratory, Asthma and Pulmonary Conditions Study Section for NIH, and an ad hoc member of several grant review sections for the National Institute of Environmental Health Sciences. She is also a member of the World Health Organization Technical Advisory Group on Global Air Pollution and Health, an Associate Editor for the journals Environmental Health Perspectives and Indoor Air, and the incoming Associate Chair of the Biomedical Institutional Review Board at CSU. She has additionally contributed written material and served on panels for the U.S. Environmental Protection Agency Integrated Science Assessment process for ambient pollution.

Richard Peltier

University of Massachusetts Amherst

Dr. Richard Peltier is an Associate Professor of Environmental Health Sciences at the University of Massachusetts Amherst. He has more than 15 years of research and teaching experience in exposure science, atmospheric chemistry, measurement outreach, data analyses, and stakeholder outreach. Dr. Peltier received a B.S. in Biology from the University of Massachusetts Amherst, a Master of Public Health in Environmental Health from Columbia University, and a Ph.D. in Atmospheric Chemistry from the Georgia Institute of Technology. He completed a postdoctoral fellowship in environmental medicine and inhalation toxicology at the New York University (NYU) Langone School of Medicine before taking an appointment at the University of Massachusetts. His lab focuses on questions at the intersection of human exposure to air pollution and health impacts, with measurement domains including traditional indoor and outdoor locations, but also in understudied regions of the world. His recent work includes research in West Africa, the Indian subcontinent (with a particular focus on India and Nepal), Central Asia, remote indigenous regions of Canada, and, most recently, in the South Pacific. Dr. Peltier is also active in novel instrument development, including the development of low-cost sensing applications in health research that are meant to better characterize human exposure to air quality. Finally, Dr. Peltier is highly active in diverse public engagement beyond the academy, including leading work for the World Meteorological Organization aimed at member states who are interested in low cost sensing applications, leading workshops at the World Health Organization on the use of these sensors, and writing explainers for United Nations Children's Fund (UNICEF) to engage the range of global field office information needs. He has receiving funding from the U.S. Environmental Protection Agency (EPA), the National Institutes of Health (NIH), the Commonwealth of Massachusetts, and the National Science Foundation (NSF). He has published 58 peer-reviewed papers, has provided ad-hoc grant reviewing for the U.S. EPA, National Science Foundation (NSF), National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), and Centers for Disease Control and Prevention (CDC), is a recent Fulbright awardee, and is the Deputy Editor in Chief for the Journal of Exposure Science and Environmental Epidemiology.

Alexandra Ponette-González

University of North Texas

Dr. Alexandra Ponette-González is Associate Professor of Geography and the Environment at the University of North Texas (UNT). Prior to her appointment at UNT, she was a National Science Foundation Minority Postdoctoral Research Fellow. She received her Ph.D. from Yale School of Forestry and Environmental Studies (2009) and an M.A. in Geography from the University of Texas at Austin (2002). Dr. Ponette-Gonzalez's research focuses on the atmospheric deposition of nutrients and pollutants to terrestrial ecosystems and the influence of human activities and global change drivers on atmosphere-to-ecosystem fluxes. Her research spans tropical as well as north temperate ecosystems. Some of her research has been at the interface of policy, management and basic science (e.g., Ponette-Gonzalez et al. 2014, 2015). Currently, and with support from a National Science Foundation Faculty Early Career Development Program (CAREER) award, she is investigating the role of black carbon in the urban carbon cycle. She is also conducting research on dust and wildfire effects on particulate matter emissions and nutrient deposition. Dr. Ponette-Gonzalez is an interdisciplinary scholar who integrates ground-based network data with remote geospatial data to better understand spatial variability in atmosphere-land interactions over small to large scales (e.g., Weathers et al. 2011, Carlson et al. 2014, Griffith et al. 2015, Ponette-Gonzalez et al. 2016, Ponette-Gonzalez et al. 2018). She and colleagues are evaluating the performance of a global 3-D chemical transport model in predicting N deposition to Latin American cities. She is a recently elected member of the Honors Committee B of the American Association of Geographers (AAG), served on the AAG Committee on the Status of Women in Geography (2015-2018), and is currently an editorial board member for Progress in Physical Geography (2020-present), Land (2019-present), and Frontiers in Water (2021-present). She has served as a panelist and reviewer for multiple National Science Foundation programs and as an ad hoc reviewer for ~20 journals in meteorology & atmospheric sciences, water resources, plant and soil sciences.

David Rich

University of Rochester Medical Center

Dr. David Q. Rich is an environmental epidemiologist and a tenured Associate Professor of Epidemiology in the Departments of Public Health Sciences, Medicine, and Environmental Medicine at the University of Rochester Medical Center in Rochester, New York. Dr. Rich is also the Research Director of the Division of Epidemiology and the Director of the Ph.D. and M.S. Programs in Epidemiology. He received his Doctor of Science degree in Environmental Health and Epidemiology from the Harvard School of Public Health in 2004 and has held academic appointments at Harvard, Rutgers University, and now the University of Rochester. His primary research interests are the reproductive and cardiorespiratory health effects of ambient air pollution with particular interest in maternal air pollution exposure during pregnancy, effects on placental development and function, metabolic dysfunction, systemic inflammation, and any resulting deficiencies in fetal growth and development. Dr. Rich has also led several accountability studies assessing the effects of air quality and environmental policies on air pollutant emissions, ambient pollutant concentrations, and morbidity and mortality in human populations in the United States and China. Some of this work has and is examining potential temporal changes in particulate matter (PM) composition and PM toxicity in the United States, and any resulting cardiorespiratory morbidity and mortality. Over the past 2 years, Dr. Rich's research has been funded by the National Institute of Environmental Health Sciences, the Health Effects Institute, and the New York State Energy Research and Development Authority.

Jeremy Sarnat

Emory University

Dr. Jeremy A. Sarnat is currently an Associate Professor of Environmental Health at the Rollins School of Public Health of Emory University and Co-Director of the Southeastern Center for Air Pollution and Epidemiology (SCAPE), based jointly at Emory University and the Georgia Institute of Technology. He holds an Sc.D. in Environmental Health from the Harvard School of Public Health. Dr. Sarnat's research focuses primarily on characterizing exposures to urban air pollution in various populations, in particular panels of sensitive cohorts such as children, older adults and individuals with cardiorespiratory disease. Much of his work examines how exposure science informs environmental epidemiology; the impact of exposure misclassification and confounding on air pollution epidemiologic findings; and, most recently, the development and application of molecular level measures of air pollution exposure and response using novel high resolution metabolomics platforms. He has served on numerous academic and research advisory boards and was an ad hoc member of Environmental Protection Agency (EPA) Clean Air Scientific Advisory Committee (CASAC) panels for both Nitrogen Oxides and Particulate Matter. Currently, Dr. Sarnat is the Principal Investigator of several exposure and epidemiologic studies investigating exposures to primary traffic pollution. In 2011, he was awarded the Joan M. Daisey Outstanding Young Scientist Award by the International Society of Exposure Science. Prior to entering academia, Dr. Sarnat worked as staff scientist for 4 years at the Israel Union for Environmental Defense in Tel Aviv, a non-profit organization of scientists and lawyers promoting sustainable development and pollution prevention.

Elizabeth A. (Lianne) Sheppard

University of Washington

Dr. Elizabeth A. (Lianne) Sheppard is Rohm and Haas Professor in Public Health Sciences and Professor in the Departments of Environmental and Occupational Health Sciences and Biostatistics at the University of Washington School of Public Health. She holds a B.A. in psychology and a Sc.M. in biostatistics from Johns Hopkins University, and a Ph.D. in biostatistics from University of Washington. Her research interests focus on exposure assessment study design, exposure modeling, and inference about the health effects of environmental and occupational exposures with particular emphasis on statistical methods. She is co-principal investigator of the Adult Changes in Thought Air Pollution Study (ACT-AP) study to determine whether air pollution exposure is associated with degradation of late-life brain health, funded by the National Institute of Environmental Health Sciences (NIEHS) and the National Institute on Aging. She is principal investigator of a study funded by the Health Effects Institute to optimize air pollution exposure assessment for inference about health effects in cohort studies. Dr. Sheppard directs two NIEHS-funded training programs, one for graduate students and postdoctoral scholars emphasizing quantitative training in the environmental health sciences, and the other for undergraduates to promote diversity in the environmental health sciences. She is a fellow of the American Statistical Association and recipient of the International Society for Environmental Epidemiology (ISEE) Research Integrity Award. She has served on the Health Effects Institute's Review Committee, the Environmental Protection Agency (EPA) chartered Clean Air Scientific Advisory Committee (CASAC), and has further advised the EPA through service on several CASAC special panels, Science Advisory Board ad hoc committees, a Federal Insecticide, Rodenticide, and Fungicide Act Scientific Advisory Panel, and a Toxic Substances Control Act Science Advisory Committee on Chemicals Panel.

Barkley Sive

National Park Service

Dr. Barkley C. Sive is an atmospheric and analytical chemist in the Air Resources Division of the National Park Service where he serves as the Program Manager for the Gaseous Pollutant Monitoring Program (GPMP). He received his B.S. and M.S. degrees in Chemistry (1993, 1995) and Ph.D. in Analytical and Atmospheric Chemistry (1998) at the University of California, Irvine. His undergraduate and graduate advisors were Professors Donald R. Blake and F. Sherwood Rowland (1995 Nobel Laureate). During his graduate career, he was awarded the UCI Town and Gown Joan Rowland Scholarship and was invited to participate in the first workshop sponsored by the German-American Academic Council, "Networks of Young Scientists in the Field of Atmospheric Chemistry and Global Change". He was a postdoctoral fellow at the University of Colorado at Boulder in the Laboratory for Atmospheric and Space Physics (LASP) and was selected to attend the fifth biannual Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS V). Prior to joining the National Park Service in 2013, he spent 13 years in academia where his research focused on atmospheric VOC measurements and regional tropospheric chemistry. To support his research, Dr. Sive received funding from National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), National Park Service, National Science Foundation (NSF) in addition to other entities such as Clean Air Task Force and the North Carolina Space Grant program. He is currently a member of EPA's Clean Air Status and Trends Network (CASTNET) Science Team and has served on numerous advisory and review panels. Recently, Dr. Sive served as a Guest Editor for a Special Issue on "Atmospheric Volatile Organic Compounds (VOCs)" in the journal *Atmosphere*. He has authored or co-authored more than 80 peer-reviewed publications and his research has been highlighted by *Nature Geosciences*, *International Innovation*, environmental research web (IOP), and *Geophysical Research Letters*. A major thrust of his current research with the National Park Service is understanding the impacts of oil and natural gas emissions on ozone production and the associated effects on park air quality in rural and remote areas.

Jason West

University of North Carolina at Chapel Hill

Dr. J. Jason West is Professor of Environmental Sciences & Engineering at the University of North Carolina at Chapel Hill. Dr. West is an engineer and leader in interdisciplinary research that connects air pollution, climate change, energy, and human health, using models of atmospheric transport and chemistry at global through local scales. He led some of the first studies to use computer models of the global atmosphere to assess the health impacts of ambient air pollution, addressing the global burden of air pollution on mortality, the co-benefits of greenhouse gas mitigation for global air quality and health, and the impacts of climate change on global air quality and health. Dr. West has served on the Scientific Steering Committee of the International Commission on Atmospheric Chemistry and Global Pollution, and the National Aeronautics and Space Administration (NASA) Health and Air Quality Applied Sciences Team, and is a Leopold Leadership Fellow. He is on the editorial board of Atmospheric Chemistry & Physics, and of the Reviews section of Environmental Research Letters. His research has recently been funded by the National Science Foundation (NSF), Environmental Protection Agency (EPA), and NASA. He has published in prominent journals including Nature Climate Change, and Nature Geoscience, and his work has been featured in major news outlets including New York Times and CBS News. He has written and spoken with the public extensively on global climate change and air pollution. He earned a B.S. from Duke University, M.Phil. from the University of Cambridge, and an M.S. and Ph.D. from Carnegie Mellon University. He worked as a researcher at the Massachusetts Institute of Technology (MIT) and Princeton, was an American Association for the Advancement of Science (AAAS) Fellow at the U.S. Environmental Protection Agency, and a visiting scientist at the National Institute for Ecology in Mexico City.

Daniel Winkler

United States Geological Survey

Dr. Daniel Winkler is a Research Ecologist with the U.S. Geological Survey. He received a B.A. in Anthropology from New York University, a M.S. in Environmental Systems from the University of California, Merced, and a Ph.D. in Ecology & Evolutionary Biology from the University of California, Irvine. Daniel is a plant ecophysiological and evolutionary ecologist studying how populations respond to global climate change, including the impacts of ozone and nitrogen pollution in the western United States. Funding sources include the Department of the Interior's U.S. Geological Survey, National Park Service, U.S. Fish & Wildlife Service, and the Bureau of Land Management. Daniel is an active member of the Ecological Society of America, the Society for Ecological Restoration, and the Botanical Society of America.