

Biosketches
Independent Particulate Matter Review Panel

H. Christopher Frey (Panel Chair)



Dr. H. Christopher Frey is the Glenn E. Futrell Distinguished University Professor of Environmental Engineering in the Department of Civil, Construction, and Environmental Engineering at North Carolina State University. Dr. Frey's research includes quantification of uncertainty in engineering process technologies and emission factors, probabilistic methods for exposure assessment, measurement and modeling of human exposure to air pollution, and measurement and modeling of vehicle emissions. He has been the principal investigator or co-principal investigator for 75 externally sponsored research projects, and has published 133 journal papers, 216 conference papers, 75 technical

reports, 8 book chapters, and one book. He teaches courses on air pollution control, environmental exposure and risk assessment, and sustainable infrastructure. Dr. Frey is an adjunct professor in the Division of the Environment and Sustainability at the Hong Kong University of Science and Technology, where he has taught a course on urban air quality and is part of a large team developing an exposure model for Hong Kong.

Dr. Frey served as a member (2008-2012) and chair (2012-2015) of the U.S. Environmental Protection Agency's Clean Air Scientific Advisory Committee (CASAC), has chaired CASAC Review Panels on Lead, Nitrogen Dioxide, and Ozone, and has served on CASAC Review Panels for all criteria pollutants including Lead, Nitrogen Dioxide, Ozone, Carbon Monoxide, Particulate Matter, and Sulfur Oxides. He served on the U.S. EPA Science Advisory Board from 2012 to 2018. For the National Greenhouse Gas Inventory Program of the Intergovernmental Panel on Climate Change (IPCC), he served as an expert and Lead Author for the chapter on uncertainties for the 2006 IPCC Guidelines on National Greenhouse Gas Emission Inventories, and in 2016 was an invited expert regarding updates to the 2006 Guidelines. Additionally, he was a technical contributor to the U.S. Department of Transportation's 2010 Report to Congress regarding Transportation's Role in Reducing U.S. Greenhouse Gas Emissions. He served on a World Health Organization working group that developed guidance on uncertainty in exposure assessment (2006). He served on two National Research Council (NRC) committees and was a member (2009-2012) of the NRC Board of Environmental Studies and Toxicology. He currently serves on the MOVES Model Review Work Group of the Mobile Sources Technical Review Subcommittee of the EPA Clean Air Act Advisory Committee (CAAAC).

In the last two years, Dr. Frey has been the principle investigator of research grants and research contracts at North Carolina State University sponsored by the North Carolina Department of Transportation, the U.S. Environmental Protection Agency via the Health Effects Institute and Eastern Research Group, and the Urban Air Initiative. Dr. Frey's research work at HKUST is funded by the HSBC 150th Anniversary Charity Programme. Dr. Frey has also conducted work for the Hong Kong Environmental Protection Department. Dr. Frey's current affiliations include serving as a member of the Transportation and Air Quality (ADC20) Committee of the Transportation Research Board, and as a member of the Publications Committee and the Critical Review Committee of the Air & Waste Management Association (A&WMA)

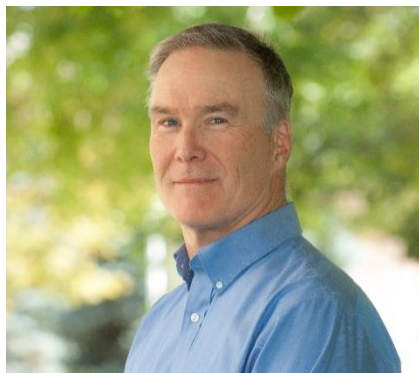
Dr. Frey is a Fellow of the Air & Waste Management Association (A&WMA) and of the Society for Risk Analysis (SRA), served on the A&WMA Board of Directors (2015-2018), and was President of SRA in 2006. He received the Chauncey Starr Award from SRA in 1999, the Lyman A. Ripperton Award from A&WMA in 2012, and the Frank A. Chambers Award from A&WMA in 2019. He has a B.S. in mechanical engineering from the University of Virginia, a master of engineering in mechanical engineering from Carnegie Mellon University, and Ph.D. in engineering and public policy from Carnegie Mellon.

Peter Adams



Dr. Peter Adams is a Professor in the Civil and Environmental Engineering Department and the Engineering and Public Policy Department at Carnegie Mellon University. Dr. Adams' research largely focuses on development of chemical transport models and their application to decision-making, especially related to PM_{2.5}. Dr. Adams also has extensive expertise in the simulation of aerosol microphysical processes, ultrafine particles and the formation of cloud condensation nuclei in global climate models. Areas of research have also included the effects of climate change on air quality, short-lived climate forcers, atmospheric ammonia and particulate matter formation from livestock operations, and the simulation organic particulate matter. Dr. Adams was selected for a Fulbright grant to collaborate with researchers at the Institute of Atmospheric Sciences and Climate in Bologna, has been a Visiting Senior Research Scientist at the National Aeronautics and Space Administration's Goddard Space Flight Center, and received the Sheldon K. Friedlander Award for outstanding doctoral thesis from the American Association for Aerosol Research. He has previously served on the Commonwealth of Pennsylvania's Air Quality Technical Advisory Committee and the Allegheny County Health Department's Air Toxics New Guidelines Proposal Committee as well as service to the American Association for Aerosol Research. His research is supported primarily by the Environmental Protection Agency, the National Science Foundation, the National Aeronautics and Space Administration, the Department of Energy, and the Department of Defense. Dr. Adams received his B.S. degree in Chemical Engineering, summa cum laude, from Cornell University. He was awarded a Hertz Foundation Applied Science Fellowship for graduate study and received M.S. and Ph.D. degrees in Chemical Engineering from the California Institute of Technology. He also holds an associated faculty position in the Chemical Engineering department at Carnegie Mellon.

John L. Adgate



John L. Adgate, Ph.D is Professor and Chair of the Department of Environmental and Occupational Health at the Colorado School of Public Health, University of Colorado. His exposure science research focuses on improving public health and epidemiological studies by documenting the magnitude and variability of human exposure to air pollutants, pesticides, metals, and allergens. His research projects have included evaluation of methods to reduce lead and allergen exposure exploration of longitudinal exposure to indoor and outdoor air pollutants, and, most recently, assessing the environmental and human health impacts of unconventional oil and gas development and the impact of climate change on indoor environments.

Dr. Adgate has served on multiple U.S.EPA Science Advisory Panels exploring technical and policy issues related to residential exposure to pesticides, metals, and implementation of the Food Quality Protection Act of 1996. He was also a member of US Institute of Medicine's Committee on Research Ethics in Housing Related Health Hazard Research in Children and the National Research Council's 2011 Committee on Indoor Air and Climate Change. Most recently he has advised the States of New York, Maryland, and Michigan on the potential public health impacts of high volume hydraulic fracturing, and leading studies exploring the public health impacts of hydraulic fracturing funded by the National Science Foundation, the National Institutes of Environmental Health Sciences, and the Department of Energy. His current research is focused on characterizing the exposures and impacts of the wide range of chemical and non-chemical stressors found in and around oil and gas development sites and indoor air and climate change funded by USEPA.

Dr. Adgate received a B.Sc. in biology from Calvin College, an M.S.P.H. from the University of North Carolina at Chapel Hill, and a Ph.D. in Environmental Health Sciences jointly awarded by Rutgers University and the University of Medicine and Dentistry of New Jersey. He has held faculty positions at the University of Minnesota and has current appointments at the University of Colorado Denver and Colorado State University. In 2006-7 he was a Fulbright Visiting Scholar at the Pontificia Universidad Católica de Chile in Santiago, where he taught risk analysis and worked on air quality research. He has served as an elected Councilor of the International Society of Exposure Science (ISES), was a recipient of its Joan M. Daisey Outstanding Young Scientist Award, and co-chaired ISES's 2009 meeting. He has taught graduate level courses on Risk Analysis and Communication, Advanced Methods in Exposure Science, Introduction to Environmental and Occupational Health, and Occupational Health and Safety.

George Allen



Mr. George Allen is a Senior Scientist at NESCAUM (Northeast States for Coordinated Air Use Management), an interagency association of the eight Northeastern States. He holds a B.S. in Electrical Engineering from Tufts University (1974). 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 is the author or co-author of more than 30 peer-reviewed journal papers on development and evaluation of measurement methods, exposure assessment, and air pollution health effects. 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 U.S. Environmental Protection Agency (EPA) and National Institutes of Health- funded air pollution studies. 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 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 US EPA (support member states' air quality programs).

John Balmes



Dr. John Balmes is Professor of Medicine at the University of California, San Francisco (UCSF) and Professor of Environmental Health Sciences in the School of Public Health at UC Berkeley. He is a member of the faculty of the UCSF Division of Occupational and Environmental Medicine and the UCSF Division of Pulmonary and Critical Care Medicine at Zuckerberg San Francisco General Hospital. He is the Director of the UC Berkeley-UCSF Joint Medical Program and the Northern California Center for Occupational and Environmental Health. Dr. Balmes received a BA in Psychology from the University of Illinois in Urbana and his MD from Mount Sinai School of Medicine. He completed a residency in Internal Medicine at Mount Sinai and a post-doctoral fellowship in Pulmonary Medicine at Yale. For over 9 years, Dr. Balmes has been studying the effects of exposures to occupational and environmental agents on respiratory and cardiovascular health. In the UCSF Human Exposure Laboratory, he has conducted controlled human exposure studies with sampling of respiratory tract lining fluid to characterize acute exposure-response relationships for oxidant pollutant-induced airway inflammation in subjects with and without asthma, and more recently, investigation of acute cardiovascular responses. Recently, his group has been funded

by the Health Effects Institute to participate in a multi-center study designed to determine whether experimental exposure to ozone induces cardiovascular toxicity (decreased heart rate variability, epithelial dysfunction, and a pro-thrombotic state) and whether any of these effects are associated with airway inflammation, systemic oxidative stress, and systemic inflammation. At UC Berkeley, Dr. Balmes has collaborated on a number of studies of the chronic effects of air pollutants on respiratory health. He has investigated the effects of exposures to air pollutants on respiratory symptoms, growth of lung function, and immune dysfunction in children with and without asthma in Fresno, CA. He contributed to the first randomized controlled trial (RCT) of a chimney stove to prevent pneumonia among infants in Guatemala and led follow-up studies on the effects of exposure to biomass smoke on lung function in both the children and their mothers. He has also participated in a second RCT of a cleaner-burning biomass stove to prevent childhood pneumonia in Malawi. He contributed to an investigation of whether chronic environmental exposure to hydrogen sulfide is associated with adverse effects on respiratory health in Rotarura, New Zealand. Dr. Balmes is one of the multiple of the Children's Health and Air Pollution Study (CHAPS) grant that is studying the adverse effects of air pollution on children living in the San Joaquin Valley. The Center project that he leads is investigating the potential effects of exposure to polycyclic aromatic hydrocarbons on risk of obesity and glucose dysregulation. Dr. Balmes has received multiple awards for his research from various organizations, including the American Thoracic Society (ATS), the American College of Occupational and Environmental Medicine (ACOEM), the Western Occupational and Environmental Medicine Association, the American Lung Association of California, and the South Coast Air Quality Management District. He is a member of the ATS, the American College of Chest Physicians, and the ACOEM. He has served on several US EPA advisory committees, including CASAC panels on ozone, NO₂, SO₂ and PM_{2.5}, as well as on various National Academy of Sciences/Institute of Medicine committees. In addition to his experience in air pollution health effects research, Dr. Balmes also has policy experience in the regulation of air quality and climate change mitigation in his role as Physician Member of the California Air Resources Board (since January 2008).

Kevin Boyle



Dr. Kevin Boyle is an environmental economist who specializes in the valuation of resources that are not traded in markets. Dr. Boyle is Professor and Director of the Virginia Tech Program in Real Estate. Prior to this position he was Head of the Department of Agricultural and Applied Economics at Virginia Tech. He was formerly Distinguished Maine Professor and Libra Professor of Environmental Economics at the University of Maine. Dr. Boyle holds a Ph.D. from the University of Wisconsin. Dr. Boyle has held editorial positions with the Journal of Environmental Economics and Management and Marine Resource Economics. Dr. Boyle was recognized by the Carnegie Foundation for the Advancement of Teaching as "U.S. Professor of the Year, Maine" in 2004. Dr. Boyle's research investigates the validity of nonmarket valuation methods, including stated preferences (contingent valuation and attribute-based choices), revealed preferences (random-utility, travel-cost models, averting behavior and hedonic, property-value models), and benefit transfers. He has published more than 90 peer-reviewed journal articles. His current research on benefit transfers establishes the theoretical basis of benefit transfers and the estimation of bounds for benefit-transfers

to address uncertainty. Dr. Boyle is serving as the PI for a National Park Service grant to develop procedures to estimate the value of changes in the annual distribution of visibility in Class 1 areas in accordance with U.S. EPA's Regional Haze Program.

Judith Chow



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 of the Desert Research Institute (DRI) of the Nevada System of Higher Education in Reno, Nevada. She was the founder and has been the director of DRI's Environmental Analysis Facility (EAF) since 1985. EAF specializes in method development and chemical analysis of airborne particles for multielements, ions, and carbon. Dr. Chow earned a B.S. degree in Biology from Fu-Jen Catholic University (Taiwan), and a S.M. degree in Environmental Health Science and a Sc.D. degree in Environmental Science and Physiology from Harvard University.

For more than 40 years, she has conducted studies and performed data analysis to improve understanding of air quality effects on human health, visibility, historical treasures, ecosystems, and climate. Dr. Chow has been principal investigator or a major collaborator in more than 50 air quality studies across the United States and in other countries. Her current research includes tracking changes in air quality with control measures at the ports of Los Angeles and Long Beach, investigating the chemical nature and composition of atmospheric brown carbon aerosol, and evaluating nitrogen partitioning and evolution of particulate organic nitrogen in fresh and aged peat fire emissions. She 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). Dr. Chow prepared and revised sections of the U.S. EPA's PM Criteria Document pertaining to chemical analysis and source emissions and contributed to EPA guidance documents on network design, continuous particulate monitoring, and particulate matter chemical speciation. She served as a chartered member (2015–2018) of EPA's Clean Air Scientific Advisory Committee (CASAC) and a member (2004–2018) of CASAC's Air Monitoring and Methods Subcommittee (AMMS, formerly the Ambient Air Monitoring and Methods Subcommittee). Dr. Chow was chair of the Publications Committee and Editorial Review Board for the Journal of the Air & Waste Management Association, serves as a Thematic Editor for Particulate Matter, and is on Editorial Boards for Air Quality, Atmosphere, & Health; Aerosol and Air Quality Research; Atmospheric Pollution Research; and Aerosol Science and Engineering. She is the principal author or co-author of more than 350 peer-reviewed articles and more than 90 peer-reviewed book chapters. She has been recognized by ISI HighlyCited.com in ecology and environment with more than 20,000 citations of her work with a h-index of 78. Dr. Chow has received the Air & Waste Management Association (AWMA)'s 2016 Arthur C. Stern Award for Distinguished Paper; California Air Resources Board's 2011 Haagen-Smit Clean Air Award for her contributions to air quality science and technology; AWMA's 2002 Frank A. Chambers Excellence in Air Pollution Control Award; and the Nevada System of Higher Education's 2001 Regents' Researcher Award.

Douglas W. Dockery



Dr. Douglas W. Dockery is the John L. Loeb and Frances Lehman Professor of Environmental Epidemiology and Chair of the Department of Environmental Health at the Harvard TH Chan School of Public Health. He is the Director of the Harvard-National Institute of Environmental Health Sciences (NIEHS) Center for Environmental Health Sciences, currently in its 52nd year. He received a B.S. in physics from the University of Maryland, an M.S. in meteorology from the Massachusetts Institute of Technology, and a ScD in environmental health from the Harvard School of Public Health. Dr. Dockery has been studying air pollution exposures and their health effects for almost 40 years. He served as Principal

Investigator of the Harvard Six Cities Study of the Respiratory Health Effects of Respirable Particles and Sulfur Oxides. His current work includes assessment of the health benefits of air pollution controls. Dr. Dockery has published over two hundred peer reviewed articles. His 1993 New England Journal of Medicine paper on air pollution and mortality in the Harvard Six Cities study is the single most cited air pollution paper. In 1998, he was honored with the first John Goldsmith Award from the International Society of Environmental Epidemiology for Outstanding Contributions to the field. Dr. Dockery's research over the past two years has been supported by grants from and contracts from the federal government (NIEHS, U.S. Environmental Protection Agency) with additional grant support from the Health Effects Institute.

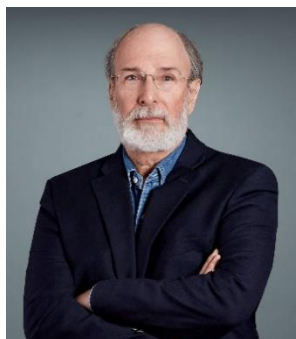
Henry (Dirk) Felton



Mr. Henry (Dirk) Felton is currently employed by the New York State Department of Environmental Conservation (NYSDEC) as a Research Scientist III. He has a Bachelor of Arts undergraduate degree in Physics from Kenyon College, Gambier Ohio (1987), and a Master of Science in Environmental Engineering from Stevens Institute of Technology in Hoboken, New Jersey (1993). He is also a Civil Engineer licensed in the State of New York. Mr. Felton's professional work has been entirely focused on ambient air monitoring. His first independent work involved setting up a monitoring network for criteria, toxic and tracer compounds around the Freshkills Landfill on Staten Island. Since then he has worked to optimize monitoring technology

to operate a rural upwind PAMS site for NARSTO-NE, conducted several experiments to evaluate new automated mass measurement technologies, initiated speciated Mercury and ultrafine monitoring programs and has designed the PM-2.5 FRM and PM speciation monitoring program in New York. Mr. Felton also was the lead for his Agency's participation in the New York PMTACS EPA SuperSite program, participated on the Board of Science Counselors review of EPA ORD's Clean Air Research program and was a two-term member of the CASAC Ambient Air Monitoring and Methods subcommittee (AAMMs). Mr. Felton currently participates on the NESCAUM Monitoring Assessment Committee (MAC), the NACAA Monitoring Steering Committee (MSC) and recently was elected to his local school board.

Terry Gordon



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 (1974) and an M.S. in Toxicology (1976) from the University of Michigan, and a Ph.D. in Toxicology from Massachusetts Institute of Technology (1981), 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 the National Institute of Environmental Health Services (NIEHS), National Institute of Allergy and Infectious Diseases (NIAID), National Coalition for Cancer Research (NCCR), U.S. Department of Defense (DOD), Bureau of Mines, Health Canada, and the U.S. Environmental Protection Agency (EPA). Dr. Gordon currently serves as Chair of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value 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 genetic host 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 susceptibility factors play a major role in environmental and occupational lung disease. In collaboration with a number of investigators in the department, his laboratory uses classic murine genetics models, computational genomics, and DNA microarrays to identify genes involved in the acute response as well as in the development of tolerance to repeated exposure to inhaled toxicants. 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. He also led a large collaborative effort amongst EPA's five original PM research centers to evaluate the in vitro and in vivo toxicity of size-segregated PM collected in the U.S. and Europe. Dr. Gordon's research has been supported by grants from both government agencies and private companies, with core grant research support primarily being from the federal government (U.S. Environmental Protection Agency, Centers for Disease Control, National Institute of Environmental Health Sciences), with additional grant support from state and local governments, and industry. Dr. Gordon is an active member of the Society of Toxicology (SOT), and has served on the Program Committee (2002-2005), the Placement Service (1998-2001), Membership Committee (2009-2012), and as President of its Inhalation Specialty Section during 2002-2003. He has served as a consultant/author to the EPA on issues of pulmonary toxicology related to the development of various documents, and he served on EPA's Clean Air Scientific Advisory Committee (CASAC) Oxides of Nitrogen (NO_x) and Sulfur Oxides (SO_x) Primary National Ambient Air Quality Standards (NAAQS) Review Panels.

Jack R. Harkema



Dr. Jack R. Harkema, DVM, Ph.D., DACVP, is a University Distinguished Professor at Michigan State University in East Lansing, MI. Dr. Harkema received a DVM (veterinary medicine) from Michigan State University (MSU) and a Ph.D. (comparative pathology) from the University of California, Davis (UCD). After completing a National Institutes of Health (NIH)-sponsored research/residency training program in comparative pathology and toxicology at the UCD, Dr. Harkema joined the scientific staff of the Lovelace Inhalation Toxicology Research Institute in Albuquerque, NM in 1985 as an experimental and toxicologic pathologist.

He later became the institute's project manager for pathogenesis research. In 1994, Dr. Harkema joined the faculty of the Department of Pathobiology and Diagnostic Investigation in the College of Veterinary Medicine at MSU. His primary research is designed to understand the pathobiology and toxicology underlying the health effects of outdoor and indoor air pollutants. In 2011, he became the director of the Great Lakes Air Center for Integrated Environmental Research, one of four U.S. Environmental Protection Agency (EPA)-funded Clean Air Research Centers in the nation. Dr. Harkema has authored or co-authored over 220 peer-reviewed scientific publications and has served on several scientific advisory committees, including those for the National Institute of Environmental Health Sciences (NIEHS), the National Toxicology Program, the EPA, and the National Academy of Sciences. Besides training graduate students, residents, and postdoctoral fellows in biomedical research, Dr. Harkema also moderates didactic courses in advanced general pathology, integrative toxicology, and pulmonary pathobiology. Dr. Harkema is a diplomate of the American College of Veterinary Pathologists (by examination) and a member of the Society of Toxicologic Pathologists, the Society of Toxicology, and the American Thoracic Society. He currently receives research funding through grants or contracts from a variety of sources including the EPA to explore and elucidate the health effects of multipollutant atmospheres in the Great Lakes region, the American Chemistry Council to study the nasal pathology and toxicology of inhaled olefin compounds, and the NIEHS/National Institutes of Health to identify the molecular mechanisms underlying toxicity of dioxin-like compounds.

Joel Kaufman



Dr. Kaufman is a physician-epidemiologist, board-certified in internal medicine and occupational medicine. A graduate of the University of Michigan (B.A., M.D.) and the University of Washington (MPH), he has been a full-time faculty member at the University of Washington (UW) since 1997. He is currently Professor in the departments of Environmental & Occupational Health Sciences, Medicine, and Epidemiology, and the Director of the UW's Occupational and Environmental Medicine Program. His current research activities are primarily focused on environmental factors in cardiovascular and respiratory disease. He is the principal investigator of a major epidemiological prospective cohort study of air pollution and cardiovascular disease (The Multi-Ethnic Study of Atherosclerosis and Air Pollution, or "MESA Air"). He directs the UW Northlake Controlled Exposure Facility, a facility

customized for experimental inhalation toxicology studies on health effects of combustion-derived pollutants including diesel exhaust. He is also principal investigator of a National Institutes of Health-funded Specialized Center for Research at the University of Washington on Cardiovascular Disease and Traffic-Related Air Pollution. Dr. Kaufman's research integrates the disciplines of epidemiology, exposure sciences, toxicology, and clinical medicine.

Patrick Kinney



Dr. Kinney [now at Boston University School of Public Health] has a broad background in environmental health sciences, with specific training and expertise in exposure assessment, respiratory health and climate change. He completed his doctoral studies in Environmental Science and Physiology at the Harvard School of Public Health in 1986. As a junior faculty member at New York University, he developed and led epidemiologic research on lung function and inflammatory biomarker changes in relation to chronic exposures to ozone and other air pollutants. Moving to Columbia in 1994, he expanded his research to include community-based studies of traffic pollutant exposures and health outcomes in

underprivileged neighborhoods in New York City, leading and contributing to several large-scale studies over the following 20 years. He has contributed to the periodic reviews of the National Ambient Air Quality Standards for ozone and particulate matter, and served on the EPA Clean Air Scientific Advisory Committee for reviews of the Nitrogen Dioxide and Sulfur Dioxide standards. He developed and currently directs the Climate and Health Program at Columbia, which trains students and postdocs in research on the health dimensions of climate variability and change. He also direct ongoing research on indoor and outdoor air quality and health in Africa, including a randomized stove trial in Ghana funded by NIEHS. Other recent funding sources include the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, and the United States Department of Transportation.

Michael T. Kleinman



Dr. Michael T. Kleinman is an Adjunct Professor of Toxicology in the Department of Medicine's Occupational and Environmental Medicine Division at the University of California, Irvine (UCI), with a joint appointment in the Program in Public Health. He was previously employed by the U.S. Atomic Energy Commission (AEC) as an environmental scientist and he directed the Aerosol Exposure and Analytical Laboratory at Rancho Los Amigos Hospital in Downey, CA. He has more than 40 years of experience researching the health effects of environmental contaminants. He holds a M.S. in Chemistry (Biochemistry) from the Polytechnic Institute of Brooklyn and a Ph.D. in Environmental Health Sciences from New York University. He is the Co-Director of the Air Pollution Health Effects Laboratory at

UCI. He has published more than 115 peer-reviewed journal articles on effects of environmental

contaminants on cardiopulmonary and immunological systems and on global and regional distribution of environmental contaminants including heavy metals and radioactive contaminants from nuclear weapons testing. He has directed more than 50 controlled exposure studies of human volunteers and laboratory animals to ozone and other photochemical oxidants, carbon monoxide, ambient particulate matter (PM) and laboratory-generated aerosols containing chemically or biologically reactive metals such as lead, cadmium, iron and manganese. He has served on two National Academy committees to examine issues in protecting deployed U.S. Forces from the effects of chemical and biological weapons. Dr. Kleinman's current research focuses on neurological and cardiopulmonary effects of inhaled particles, including nanomaterials and ultrafine, fine and coarse ambient particles in humans and laboratory animals. His recent health effects studies have the role of inhaled combustion-generated particles on the promotion of airway allergies and acceleration of development of cardiovascular disease and how these effects are mediated by organic and elemental carbon components of PM. Dr. Kleinman's current research grants and contracts include a grant to examine the effects of inhaled particles on brain stem cells related to tumor development from the California Brain and Lung Tumor Foundation, a contract from the California Environmental Protection Agency to study the role of semi-volatile components of fine and ultrafine PM on cardiac function and atherosclerosis, and a contract to examine the effects of long term inhalation exposure to concentrated fine particles on brain inflammation. Dr. Kleinman has previously served on the U.S. EPA Clean Air Scientific Advisory Committee (CASAC) Ozone, PM and NO₂ panels and was appointed to Chair the Scientific Review Panel for Toxic Substances for the state of California. Dr. Kleinman's current research focuses on neurological and cardiopulmonary effects of inhaled particles, including nanomaterials and ultrafine, fine and coarse ambient particles in humans and laboratory animals. His recent health effects studies have the role of inhaled combustion-generated particles on the promotion of airway allergies and acceleration of development of cardiovascular disease and how these effects are mediated by organic and elemental carbon components of PM. Dr. Kleinman is a co-Investigator on grants from NIH and NSF as well as contracts from the California Brain and Lung Tumor Foundation and from the California Environmental Protection Agency to study the role of semi-volatile components of fine and ultrafine PM on cardiac function, atherosclerosis, and effects of subchronic and chronic inhalation exposures to concentrated fine particles on brain inflammation.

Rob McConnell



Rob McConnell is a physician and epidemiologist, a Professor of Preventive Medicine, and the director of Southern California Children's Environmental Health Center at the University of Southern California, where he has studied the effects of air pollution on children's health. He has been the principal investigator or project director on several large National Institutes of Health-funded R01s or Centers supporting the Southern California Children's Health Study, a large, ongoing longitudinal cohort study that has made important contributions to understanding the role of air pollution in childhood origins of respiratory and cardiometabolic health and obesity. His research interests include, in addition, novel methods for assessment of environmental exposure and understanding susceptibility to the effects of air pollution related to psychosocial stress and social factors, exercise, co-exposures associated with housing conditions, as well as genetics. Other interests include the development of methods for estimating the burden of disease associated with near-roadway air

pollution and for assessing exposure in environmental epidemiology. He directs the Career Development Program of the NIEHS-supported Southern California Environmental Health Sciences Center. Before coming to USC, Dr. McConnell directed a World Health Organization (WHO) regional center for environmental health in Latin America and the Caribbean, where he was a member of advisory committees to the Ministries of Health in the Americas and of the senior management team to the WHO Regional Director for the Americas. He is a fellow of the American Association for the Advancement of Science.

Richard Poirot



Mr. Richard Poirot is an independent consultant who recently retired as the Air Quality Planning Chief with the Vermont Department of Environmental Conservation, where he's worked since 1978. During his 37 years in VT state government, Rich's responsibilities included developing and implementing State Implementation Plans to ensure attainment and maintenance of federal and state air quality standards for ozone, particulate matter, and regional haze. He developed interests and expertise in drawing inference on the nature of pollution sources from analysis of ambient air quality and meteorological measurement data. Rich

has been an active participant on the Acid Deposition Committee and the Ambient Monitoring and Assessment Committee for the Northeast States for Coordinated Air Use Management (NESCAUM); the U.S. Environmental Protection Agency (EPA) Acid Rain Advisory Committee; the Data Analysis Workgroup for the Ozone Transport Assessment Group (OTAG); the Science and Technical Support Workgroup for the Federal Advisory Committee on Ozone, Particulate Matter and Regional Haze (OPRHA); the Monitoring and Data Analysis Workgroup for the Mid Atlantic/Northeast Visibility Union (MANE-VU), the Steering Committees for the Interagency Monitoring of Protected Visual Environments (IMPROVE); the Subcommittee on Scientific Cooperation for the U.S./Canada Air Quality Agreement; the EPA Clean Air Scientific Advisory Committee (CASAC), the CASAC Ambient Air Monitoring and Methods Subcommittee, the CASAC Panels for Particulate Matter, Ozone, Lead, and Secondary SO_x and NO_x National Ambient Air Quality Standards Review; the NARSTO External Review Panel; the U.S. EPA Advisory Council on Clean Air Compliance Analysis and the Council Subcommittee on Ambient Air Modeling; and the Board on Environmental Studies and Toxicology (BEST) for the National Research Council. He is not currently a recipient of research grants from the Environmental Protection Agency, other federal agencies, or the private sector.

Jeremy A. Sarnat



Dr. Jeremy Sarnat is currently an Associate Professor of Environmental Health at the Rollins School of Public Health of Emory University. 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 the application of these findings towards the development of novel spatiotemporal models of personal air pollution exposures. Currently, Dr. Sarnat is the Principal Investigator of several panel studies investigating exposures to primary traffic pollution in cohorts of healthy and asthmatic subjects and corresponding acute cardiorespiratory response. He is also the co-Director of the Southeastern Center for Air Pollution and Epidemiology (SCAPE), based jointly at Emory University and the Georgia Institute of Technology.

Elizabeth A. (Lianne) Sheppard



Dr. Elizabeth A. (Lianne) Sheppard, PhD is 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 modeling and understanding the health effects of environmental and occupational exposures with particular emphasis on statistical methods for environmental and occupational epidemiology. She is principal investigator of the ACT-AP study, which aims to determine whether air pollutants are associated with cognitive decline and dementia incidence, as well as markers of Alzheimer's disease, in the Puget Sound, an area with relatively low levels of air pollution. She actively collaborates on a variety of research projects in the environmental and occupational health sciences and has been the lead statistician for the Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air) study, a 10-year study funded by EPA to determine the effect of long-term air pollution exposure on subclinical progression of cardiovascular disease. Dr. Sheppard directs a NIEHS-funded program for quantitative training in the environmental health sciences. She is a fellow of the American Statistical Association, recently served on the Health Effects Institute's Review Committee, and has served on the Clean Air Scientific Advisory Committee and its special panels, as well as other EPA review panels.

Barbara J. Turpin



Dr. Barbara J. Turpin is a Professor in Environmental Sciences and Engineering, University of North Carolina at Chapel Hill. She specializes in atmospheric organic chemistry that transforms gaseous emissions into particulate matter (PM) affecting health, visibility and climate. She was the first to publish time-resolved measurements that provided atmospheric evidence for the formation of secondary organic aerosol (Turpin et al., 1991). Her group was the first to recognize that secondary organic aerosol forms through gas followed by aqueous chemistry in clouds, fogs and wet aerosols (Blando et al., AE 2000). Her 2000 organic aerosol review paper has been called a “primer” on organic aerosol measurement and was awarded Atmospheric Environment’s Haagen Smit Prize. Professor Turpin’s research continues to provide novel insights into the sources, properties and behavior of atmospheric organic aerosol. She also makes substantive contributions to the understanding of PM exposure and has conducted collaborative PM and health research.

Dr. Turpin obtained a BS at the California Institute of Technology, a PhD from OGI - Oregon Health Sciences University and did postdoctoral research at the University of Minnesota Particle Technology Laboratory. She joined the faculty of Rutgers University in 1994 and moved to the University of North Carolina at Chapel Hill in 2015. Professor Turpin is a Fellow of the American Association for the Advancement of Science (AAAS), the American Geophysical Union (AGU), and the American Association for Aerosol Research (AAAR). She is a recipient of AAAR’s Sinclair Award for “sustained excellence in aerosol research and technology by an established scientist still active in his/her career.” She is an Associate Editor of the prestigious journal, *Environmental Science and Technology*. Professor Turpin is a Past President of the American Association for Aerosol Research and just completed her term as a member of the International Commission for Atmospheric Chemistry and Global Pollution (iCACGP). She has published over 100 peer-reviewed papers (avg citations/paper = 71; h-index = 44) and received over \$10M of research funding from sources such as the Environmental Protection Agency (STAR), National Science Foundation, National Oceanic and Atmospheric Administration, Sloan Foundation, Health Effects Institute, New Jersey Department of Environmental Protection and Electric Power Research Institute.

Ronald Wyzga



Dr. Ronald Wyzga is Technical Executive in the Air Quality Health Effects program area of the Environment Sector at the Electric Power Research Institute. He received an AB degree in mathematics from Harvard College and an M.S. degree in statistics from Florida State University. He also received a Sc.D. degree in biostatistics from Harvard University. Dr. Wyzga has authored an extensive list of publications on his research. His current research activities focus on understanding the relationship between health effects and air pollution, an area in which he has worked for over 30 years. Dr. Wyzga is particularly interested in the design, conduct, and interpretation of epidemiological studies that examine this relationship. He is also interested in health risk assessment methods. Dr. Wyzga has studied the relationship between health effects and air pollution since he joined EPRI in 1975. In addition, he has worked on methods to attach economic values to air pollution damage and effects. Dr. Wyzga has served on, and has chaired, several committees for the EPA Science Advisory Board and National Academy of Sciences. He has also served on advisory oversight committees for several research programs on the health effects of air pollution. In 1990, Dr. Wyzga was elected a Fellow of the American Statistical Association by his peers. Prior to joining EPRI, he worked at the Organization for Economic Cooperation and Development (OECD) in Paris, where he co-authored a book on economic evaluation of environmental damage.