

**Invitation for Comments on “Short List” Candidates for the
Clean Air Scientific Advisory Committee (CASAC)
CASAC Ozone Review Panel**

EPA Science Advisory Board (SAB) Staff Office

The EPA Science Advisory Board (SAB) Staff Office reopened the public nomination process for experts to serve on the **Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel** and has solicited additional nominations for this Panel.

Nominations for technical experts to supplement the chartered (statutory) CASAC membership were originally requested in the *Federal Register* (68 FR 35212) on June 12, 2003. In response to this *Federal Register* notice, the SAB Staff Office received nominations for additional scientific experts, and previously published (in February 2004) a “Short List” of candidates on the SAB Web site (<http://www.epa.gov/sab/panels/casacorpanel.html>) for the purpose of soliciting public comments. Per the follow-on notice which appeared in the *Federal Register* (69 FR 68350) on November 24, 2004, given the lengthy period of time that has elapsed since its first announcement, the SAB Staff Office reopened the public nomination process for experts to serve on this Panel. Information on the CASAC and the Panel and the nomination process appear in the above-referenced notices and the CASAC Ozone Review Panel page on the SAB Web site (<http://www.epa.gov/sab/panels/casacorpanel.html>). Pursuant to the *Federal Register* notice, recognized, national-level experts were sought in one or more of the following seven disciplines:

(a) **Atmospheric Science**. Expertise in physical/chemical properties of ozone and other photochemical oxidants, their precursor substances, and atmospheric processes involved in the formation, transport, and degradation of ozone and other photochemical oxidants in the atmosphere, including interaction with global climate and stratospheric ozone. Also, expertise in the evaluation of natural and man-made (anthropogenic) sources and emissions of precursors of tropospheric ozone and other photochemical oxidants, pertinent monitoring/measurement methods for such substances, and spatial/temporal trends in atmospheric concentrations of them.

(b) **Exposure and Risk Assessment/Modeling**. Expertise in measuring human population exposure to ozone and/or in modeling human exposure to ambient and indoor pollutants. Also, expertise in human health risk analysis modeling for ozone or other pollutants causing respiratory and/or other non-cancer health effects.

(c) **Ecological Effects and Resource Valuation**. Expertise in evaluation of: patterns of exposure to ozone and/or other photochemical oxidants of ornamental and/or agricultural plants and/or natural ecosystems and their components; effects of ozone and other photochemical oxidants on natural ecosystems (especially terrestrial) and their components (both flora and fauna), ranging from biochemical/sub-cellular effects and identification of indicators of pathophysiological effects at the individual plant level, to effects on species and populations, on up to include impacts on increasingly more complex (*e.g.*, landscape) levels of ecosystem

organization. Also, expertise in (i) ecosystem risk assessment and (ii) ecological resource valuation/economics.

(d) **Dosimetry**. Expertise in conducting and/or evaluation of the dosimetry of animal and human subjects, and animal-to-human dosimetry extrapolations, including identification of factors determining differential patterns of inhalation and/or deposition/uptake in respiratory tract regions that may contribute to differential susceptibility of human population subgroups to ozone and other photochemical oxidants.

(e) **Toxicology**. Expertise in conducting and/or evaluation of experimental laboratory animal studies of the potential health effects of ozone and/or other photochemical oxidants on respiratory and non-respiratory (e.g., lung defense/other immune function mechanisms) endpoints.

(f) **Controlled Human Exposure**. Expertise in conducting and/or evaluation of controlled human exposure studies of the effects of ozone and other photochemical oxidants on healthy and compromised (having pertinent preexisting chronic disease, e.g., asthma) human adults and children, including medical doctors (M.D.) with experience in the clinical treatment of asthma.

(g) **Epidemiology and Biostatistics**. Expertise in epidemiological evaluation of the effects of exposures to ozone and other photochemical oxidants and/or other ambient air co-pollutants on human population groups, including effects on mortality and/or morbidity (e.g., respiratory symptoms, lung function decrements, asthma medication use, respiratory-related hospital admissions) endpoints. Also, expertise in associated biostatistics and/or health risk analysis.

The SAB Staff Office has reviewed the nominations and identified 27 candidates to supplement CASAC members on the CASAC Ozone Review Panel. Brief biographical sketches (“biosketches”) on these candidates are provided below. *We hereby invite comments from members of the public for relevant information, analysis or other documentation that the SAB Staff Office should consider in the selection of the Ozone Review Panel.* In addition, the biosketches for the members of the chartered CASAC may be viewed at the following URL: http://www.epa.gov/sab/pdf/casac_2005bios_for_web.pdf.

Any information furnished by the public in response to this SAB Web site posting — and the previous posting in February 2004 — will be considered by the SAB Staff Office. Prior to final panel selection, the combined information will be reviewed and evaluated for any possible financial conflict of interest or a possible appearance of a lack of impartiality. The information will also be used to ensure appropriate balance and breadth of expertise needed to address the charge to the Panel. The SAB Staff Office Director makes the final decisions concerning who will serve on the Ozone Review Panel

Please e-mail your comments no later than **January 17, 2005** to Mr. Fred Butterfield, CASAC Designated Federal Officer, at: butterfield.fred@epa.gov.

CASAC OZONE REVIEW PANEL CANDIDATES

Dr. John R. Balmes (M.D.)

Dr. Balmes is a Professor of Medicine at the University of California, San Francisco (UCSF) where he is the Chief of the Division of Occupational and Environmental Medicine at San Francisco General Hospital (SFGH), Director of the Human Exposure Laboratory of the Lung Biology Center, and the Principal Investigator of the UCSF Pediatric Environmental Health Specialty Unit. He is also Professor of Environmental Health Sciences at the University of California, Berkeley where he is the Director of the Northern California Center for Occupational and Environmental Health and the Center for Excellence in Environmental Public Health Tracking.

Dr. Balmes received his BA from the University of Illinois (Urbana) in 1972. He received his MD from the Mount Sinai School of Medicine of the City University of New York in 1976. He completed a Residency in Internal Medicine at the Mount Sinai Hospital at New York City in 1979 and a fellowship in Pulmonary Medicine with additional training in occupational medicine in 1982. He is board-certified in Internal Medicine and Pulmonary Medicine and actively practices pulmonary and critical care medicine at SFGH.

Dr. Balmes leads a research program involving the respiratory effects of ambient air pollutants. In his laboratory at UCSF, he conducts controlled human exposure studies of the acute effects of ozone and other pollutants. At UC Berkeley, he collaborates in epidemiological studies of the chronic effects of air pollutants. He has published over 160 papers or chapters on occupational and environmental respiratory disease-related topics with many of these dealing with the potential health effects of ambient air pollutants, especially ozone. Dr. Balmes' expertise in the health effects of ambient air pollutants has been recognized by multiple awards including the following: an Environmental/Occupational Medicine Academic Award from the National Institute of Environmental Health Science (1991-1996); the Clean Air Research Award from the American Lung Association of San Francisco and San Mateo in 1997; and the Clean Air Award from the American Lung Association of California in 1999.

Dr. Balmes currently serves as a member of the Research Screening Committee of the California Air Resources Board (CARB) and was a member of the Air Quality Advisory Committee of the Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency from 1992-2004. He has served the U.S. Environmental Protection Agency in many capacities. In 1992, he served on the Clean Air Scientific Advisory Committee Oxides of Nitrogen Review Panel and was invited to participate in a Workshop on Health Issues on Air Quality Criteria for Ozone and Related Photochemical Oxidants. He contributed to the writing of the Air Quality Criteria Document for Ozone in 1993-1994. He was a Consultant Reviewer of the Air Quality Criteria Document for Particulate Matter in 1995, was invited to participate in a Workshop on Asthma and the Environment in 1996, and was a Consultant Reviewer of the Air Quality Criteria Document for Ozone in 2003. In addition, he served as a consultant advisor regarding epidemiologic research on the health effects of ozone to the Health Effects Institute from 1990-1992.

Dr. Balmes' research program has been supported by the National Institutes of Health, the Health Effects Institute, the Centers for Disease Control and Prevention, the California Air Resources Board, and the Flight Attendants Medical Research Institute. Currently funded projects include a study of the effects of chronic exposure to ozone on lung function (NHLBI), a study of the respiratory effects of early life exposure to biomass smoke (NIEHS), a study of both short-term and long-term responses of asthmatic children to air pollutants (CARB), a study of the effects of polymorphisms in antioxidant enzymes on ozone-induced allergic airway inflammation (CARB), and a center of excellence for environmental public health tracking (CDC).

Dr. Balmes is on the editorial board of the *International Journal of Occupational and Environmental Health* and is an active reviewer for multiple clinical and environmental health journals, including *the New England Journal of Medicine*, *JAMA*, *the American Journal of Respiratory and Critical Care Medicine*, *the European Respiratory Journal*, *Occupational and Environmental Medicine*, and *Environmental Health Perspectives*.

Dr. Balmes is a member of multiple professional societies and organizations, including the American and California Thoracic Societies, the American College of Chest Physicians, the American College of Occupational and Environmental Medicine, the Society for Occupational and Environmental Health, and the International Society for Environmental Epidemiology. He was Chair of the Environmental and Occupational Health Scientific Assembly of the American Thoracic Society in 1997-1999 and President of the California Thoracic Society in 2001-2002.

Ms. Lauraine G. (Laurie) Chestnut

Ms. Laurie Chestnut, a managing economist at Stratus Consulting, Inc., is an economist who specializes in the quantification and monetary valuation of human health and environmental effects associated with air pollutants. Ms. Chestnut received a B.A. in economics from Earlham College, Richmond, Indiana, in 1975, and an M.A. in economics from the University of Colorado, Boulder, in 1981. She has 22 years of experience with Stratus Consulting and its predecessors working for clients including the U.S. Environmental Protection Agency, the California Air Resources Board, Environment Canada, the World Bank, the Asian Development Bank, the South Coast Air Quality Management District, the American Lung Association, and the Clean Air Task Force quantifying the damages of air pollution, including human health effects, visibility aesthetics, materials damages, and crop damage.

Ms. Chestnut has conducted original economic and survey research to estimate the value to the public of protecting human health and visibility aesthetics from the effects of air pollution. She has developed quantification models to estimate the health benefits of reductions in air pollutants that have been used to assess the benefits of provisions of the Clean Air Act in the U.S., proposed Canadian air quality standards, air quality standards in Bangkok, and elsewhere.

Ms. Chestnut has published articles related to this work in *Land Economics*, *Environmental Research*, *Journal of the Air and Waste Management Association* and *Journal of Policy Analysis and Management*, and as chapters in the following titled books: *Valuing Cultural Heritage*, *Air Pollution and Health*, and *Air Pollution's Toll on Forests and Crops*. She managed an epidemiology and economic study of the health effects of particulate air pollution in Bangkok, working closely with the Thai Pollution Control Department, the School of Public Health at

Chulalongkorn University, and the World Bank. Ms. Chestnut co-authored publications on the Bangkok studies in the *Journal of the Air and Waste Management Association*, *Environmental Health Perspectives*, *American Journal of Agricultural Economics*, and *Journal of Exposure Analysis and Environmental Epidemiology*. She is a member of the Association of Environmental and Resource Economists and of the Air and Waste Management Association. Ms. Chestnut currently serves on the EPA Science Advisory Board's Advisory Council on Clean Air Compliance Analysis.

Ms. Chestnut's sources of recent grant and/or other contract support funding include: (1) "Economic valuation of health risks associated with criteria air pollutants and air toxics," a U.S. EPA-funded cooperative agreement with Cornell University on which Stratus Consulting was a subcontractor and she was a project principal investigator (PI); (2) "Benefits assessment of ozone generator regulations," a contract funded by Health Canada to examine potential health benefits of regulatory limits on indoor ozone generators for residential use; (3) "Economic valuation of hospitalizations associated with exposures to particulate matter and ozone," a grant to San Diego State University, on which Stratus Consulting was a subcontractor and Ms. Chestnut was a project PI, funded by the California Air Resource Board; and (4) "Benefits assessment update for Title IV," a contract funded by the U.S. EPA, Clean Air Markets Division, examining the health and welfare benefits of Title IV required reductions in SO₂ and NO_x emissions. (Note: This latter work focuses on expected reductions in PM_{2.5} concentrations; potential ozone-related benefits are not being estimated at this time.)

Dr. William (Jim) Gauderman

Dr. Gauderman is Associate Professor of Preventive Medicine at the University of Southern California (USC). He is currently director of the biostatistics core for an NIH-funded program project grant entitled "Genetics, Air Pollution and Respiratory Effects in Children and Young Adults." This project is focused on determining whether air pollution in southern California is associated with permanent deficits in lung function and with increased risk of asthma, and whether these effects are magnified in genetically susceptible subgroups. Dr. Gauderman is also principal investigator of an NIH-funded research project entitled "Statistical Approaches to the Study of Gene-Environment Interaction." In this work, he has developed statistical methods for finding and characterizing genes that interact with environmental factors to cause disease and other complex human traits. Dr. Gauderman also collaborates with many investigators in the design and statistical analysis of several studies, including studies of colorectal and breast cancer, and studies focused on assessing exposure to air pollution.

Dr. Gauderman has published 68 articles in peer-reviewed scientific journals, including journals that focus on statistical methods, epidemiology, and respiratory health. Two of his papers, related to the association between air pollution and children's lung function development, have demonstrated that exposure to air pollution can have long-term effects on children's respiratory health. This work has had a significant impact in both the scientific and regulatory communities.

Dr. Gauderman received a B.A. in mathematics from California State University, Fullerton in 1986, an M.S. in biometry from USC in 1988, and a Ph.D. in biometry from USC in 1992. In addition to the above-mentioned NIH-funded projects, Dr. Gauderman is also supported through December, 2003 on a contract from the California Air Resources Board. This contract has

supported The Children's Health Study, a 10-year cohort study initiated in 1993 to study the effects of air pollution on children's respiratory health. The program project grant mentioned above is based largely on continued follow-up of this Children's Health Study cohort. Dr. Gauderman also has additional support to collaborate on other health-related research projects, including support from NCI, NIEHS, NHLBI, and EPA.

Dr. Mark Fenn

Dr. Mark Fenn has worked as a research scientist with the USDA Forest Service, Pacific Southwest Research Station (PSW) in Riverside, CA since June 1986. He received a B.S. in Agriculture from the University of Arizona in 1981, and a Ph.D. in Plant Pathology from the University of California, Riverside in 1986. Dr. Fenn's areas of expertise and research activities and interests include: nitrogen deposition and ecological effects of air pollutants, and interactive effects of ozone and nitrogen deposition, with an emphasis on the western United States and the Valley of Mexico.

Dr. Fenn is a member of the Ecological Society of America, the North American Air Pollution Workshop Group, the Atmospheric Changes and Forests Working Group of the North American Forestry Commission, the International Union of Forest Research Organizations, and the American Geophysical Union. He has been lead author on several publications reviewing what is known of nitrogen deposition effects on natural ecosystems in North America and in western North America. Two publications received the Distinguished Publication Award given by the PSW Forest Service Research Station and another has recently been nominated. In 2002, Dr. Fenn was primary editor of a volume summarizing many years of research on urban air pollution effects on forests surrounding Mexico City. Other important review publications focus on the combined effects of ozone and nitrogenous pollutants within the context of multiple ecosystem stressors. He has authored 64 scientific publications, mostly on the topic of air pollution and associated ecological and environmental effects. Dr. Fenn is considered an authority on nitrogen deposition impacts on western ecosystems.

Dr. Fenn has served on scientific advisory committees within the U.S. Forest Service, and air pollution-related advisory committees within the Department of Defense and the Ecological Society of America. He has also been invited to contribute to national assessments of air pollution impacts on natural resources in reports to Congress (National Acid Precipitation Assessment Program) and a national review of air pollution effects on drinking water from national forests and grasslands. His research has also been instrumental in providing research information for criteria documents and other government assessment reports related to ecological impacts from air pollution. In recent years, Dr. Fenn has received grants in support of air pollution ecological research studies from various public funding agencies including the USDA Forest Service, the U.S. EPA, the National Park Service, and the State of California.

Dr. Henry Gong (M.D.)

Dr. Henry Gong, Jr., M.D., received his B.A. (Biology) from the University of the Pacific, Stockton, CA, and his M.D. in 1973 from the University of California at Davis. He then completed a Medicine residency at Boston University Medical Center and a Pulmonary Medicine Fellowship at the University of California at Los Angeles (UCLA). Dr. Gong remained on the full-time UCLA faculty for 15 years. He was the Associate Chief of the Pulmonary and Critical

Care Medicine Division, UCLA Medical Center (1985-1992), and promoted to Professor of Medicine in 1989. Dr. Gong moved to Rancho Los Amigos Medical Center (RLAMC), Downey, CA, in 1992, where he has since been the Chief of the Environmental Health Service, an established research facility investigating the health effects of air pollution. Since 1992, he is/was the Chair of the Department of Medicine, Medical Director of Respiratory Therapy, and Chair of the Research Committee (IRB) and the Continuing Medical Education Committee at RLAMC, as well as a Professor of Medicine and Preventive Medicine, University of Southern California (USC).

Dr. Gong is an established, practicing Board-certified pulmonologist/internist with expertise in clinical asthma and altitude effects in patients with cardiopulmonary disorders. He has served on the Asthma Advisory Panel of Blue Cross of California since 1999. He was a Visiting Professor to Henry Ford Hospital and Medical Centers, Detroit, MI (June, 2000) and Singapore National University, Singapore (November, 2000). His long-time efforts in pollution-related health effects were recognized by his receipt of the 2000 Clean Air Award from the American Lung Association of California (September, 2000) and the Carl Moyer Award from the Coalition for Clean Air (May, 2001).

Dr. Gong has written over 250 papers, chapters, or books on respiratory-related and air pollution topics, including ozone-related health effects. He was a key contributor to the monograph "Considerations for Diagnosing and Managing Asthma in the Elderly" (February, 1996, Division of Lung Diseases, NHLBI, NIH). Dr. Gong is/was on the Editorial Board of several journals (*Journal of Clinical Pharmacology*; *The American Journal of Critical Care*; *Archives of Environmental Health*) and a reviewer for over 20 clinical and environmental journals, including the *New England Journal of Medicine*, *American Journal of Respiratory and Critical Care Medicine*, *Chest*, *Journal of Clinical Allergy and Immunology*, *Annals of Internal Medicine*, *Environmental Research*, *Archives of Environmental Health*, *Journal of the Air & Waste Management Association*, and *Environmental Health Perspectives*. In addition, he has been a consultant or reviewer for numerous State, national, and other organizations, such as the Electric Power Research Institute, Southern California Edison, University of California Research Programs, U.S. Environmental Protection Agency (EPA), National Institute of Environmental Health Sciences (NIEHS), Health Effects Institute (HEI), and the Air Quality Advisory Committee of the California Environmental Protection Agency.

Dr. Gong served on the Special Review Committee on "RFA 92-04, Ozone: Mechanisms of Action" (NIEHS, March, 1993) and as a Consultant/Contributor to the Air Quality Criteria for Ozone and Related Photochemical Oxidants (Revision), Environmental Criteria and Assessment Office (EPA, 1993-1994), as well as an external peer reviewer of the EPA's long-term Asthma Research Strategy (2000). Dr. Gong's research program has been supported by the U.S. EPA, NIEHS, California Air Resources Board, Electric Power Research Institute, American Lung Association, pharmaceutical firms, and other organizations. He is currently the Director and Principal Investigator of the five-year Southern California Center for Children's Environmental Health and Disease Prevention Research: Respiratory Disease and Prevention, which is co-funded by the NIEHS and U.S. EPA. Other recently-funded research involves controlled human exposures to concentrated ambient particulates and diesel exhaust (from Health Effects Institute and the EPA-supported Southern California Particle Center and Supersite) and to particulates

with nitrogen dioxide (EPA). He serves on local and state air pollution committees, such as the PM10 Task Force and the Asthma and Outdoor Air Quality Consortium (South Coast Air Quality Management District).

Dr. Gong is a member of numerous professional organizations or societies, such as the American Thoracic Society and Western Society for Clinical Investigation. Dr. Gong was President of the California Chapter of the American College of Chest Physicians in 1991-92. He is currently a Fellow and former Governor of Southern California of the American College of Chest Physicians.

Dr. Paul J. Hanson

Dr. Paul J. Hanson is a Senior Research and Development Scientist of the Environmental Sciences Division, Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee. He graduated summa cum laude with a B.A. degree in biology from St. Cloud State University, St. Cloud, Minnesota, in 1981. Dr. Hanson also received M.S. and Ph.D. degrees from the University of Minnesota, St. Paul in the fields of plant and forest tree physiology, in 1983 and 1986, respectively.

Dr. Hanson has conducted research on the impacts of air pollutant oxidants (ozone and hydrogen peroxide) on forest plant physiology and growth, the deposition of gaseous nitrogen compounds to plant surfaces, and the exchange of mercury vapor between terrestrial surfaces and the atmosphere. As a part of his work on the impact of ozone on northern red oak photosynthesis, ozone exposure and uptake response curves were evaluated. Dr. Hanson's current research focuses on the impacts of climatic change on the physiology, growth, and biogeochemical cycles of eastern deciduous forest ecosystems. He has authored or co-authored over 100 journal articles and book chapters, and has recently co-edited (and authored) a book titled "North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes" published in 2003 as volume 166 of the Springer Ecological Studies series. Dr. Hanson was a contributing author to EPA's Air Quality Criteria Document (AQCD) for Particulate Matter (1994-1996), and the AQCD for Oxides of Nitrogen (1988-1990).

Dr. Hanson served as an Associate Editor of the Journal of Environmental Quality for six years (1995-2000), and is a long-standing member of the editorial review board of Tree Physiology. He is a current member of the U.S. Department of Energy's National Technical Advisory Committee for the National Institute of Global Environmental Change (NIGEC), and has served on a number of peer-review panels for the evaluation of scientific proposals. Dr. Hanson received the 1995 Distinguished Scientific Achievement Award from the Environmental Sciences Division, Oak Ridge National Laboratory.

Dr. Hanson's recently-funded grant proposals are as follows: (1) Regulation of carbon sequestration and water use in an Ozark Forest: Proposing a new strategically located Ameriflux tower site in Missouri; U.S. Department of Energy, 2003-2005; \$1.4 million over three years; (2) Identifying Critical Thresholds for Plant/Ecosystem Response to Moisture Stress; U.S. Department of Energy, 2002-2004; \$900,000 over three years; (3) Enriched Background Isotope Study (EBIS); U.S. Department of Energy, 2002-2004; \$2.7 million over three years; (4) Mechanisms of forest ecosystem adjustments to altered precipitation: the Walker Branch

Throughfall Displacement Experiment (TDE); renewal proposal 2002-2006; \$2,200,000 over five years.

Dr. Jack R. Harkema

Dr. Jack R. Harkema is a University Distinguished Professor at Michigan State University (MSU). He has been on the MSU faculty in the Department of Pathobiology and Diagnostic Investigation, College of Veterinary Medicine, since 1994. Dr. Harkema received his B.S. in biology and chemistry from Calvin College in 1975; and his M.S. (animal physiology) and D.V.M. from Michigan State University in 1977 and 1980, respectively.

From 1980 to 1982, he was a postdoctoral fellow at the Lovelace Respiratory Research Institute (LRRRI) in Albuquerque, NM, working on morphometric and physiologic methods to correlate changes in pulmonary function and structure of laboratory rodents exposed to inhaled toxicants. Dr. Harkema completed his residency training in veterinary pathology and his Ph.D. in comparative pathology at the University of California-Davis in 1985. His dissertation work was the first laboratory studies to demonstrate that ozone is a nasal toxicant. Dr. Harkema was a staff pathologist and manager of the pathogenesis program at the LRRRI from 1985 to 1994, before returning to MSU.

Dr. Harkema is a board-certified veterinary pathologist (American College of Veterinary Pathologists, by examination) and a member of the Society of Toxicologic Pathologists. He is also an active member in the Society of Toxicology and the American Thoracic Society. Dr. Harkema is internationally-recognized as an expert on the nasal and pulmonary toxicology of laboratory animals. Throughout his career, Dr. Harkema has focused his research predominantly on understanding the cellular and molecular mechanisms responsible for airway epithelial injury, remodeling and repair after short- and long-term exposures to inhaled xenobiotics (*e.g.*, ozone, particulate matter, endotoxin, allergens). He has authored or co-authored over 150 publications and has been the principal or co-investigator of research grants from federal, state, and private institutions such as the National Institutes of Health, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), the Health Effects Institute (HEI), the Michigan Life Sciences Corridor, and the American Lung Association (ALA).

Dr. Harkema has served on several scientific subcommittees for various federal or state agencies including the National Academy of Sciences. Dr. Harkema is also the co-designer and current director of the MSU Mobile Air Research Laboratory which is a 53-foot semi-trailer equipped with a state-of-the-art, air particle concentrator and inhalation toxicology exposure system that allows investigators to conduct atmospheric and toxicologic studies of “real-world” particulate air pollution in urban (or rural) communities throughout the United States.

Dr. Philip K. Hopke

Dr. Philip K. Hopke is the Bayard D. Clarkson Distinguished Professor at Clarkson University and the Director of the Center for Air Resources Engineering and Science. In October 1997, he was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC), which is administratively located at EPA under the Science Advisory Board (SAB). Dr. Hopke is the outgoing Chair of the CASAC, and he also chairs the CASAC Ambient Air Monitoring and Methods (AAMM)

Subcommittee. In addition, he serves as an SAB Board Member. Professor Hopke is the current President of the American Association for Aerosol Research, and is a member of the National Research Council's Congressionally-mandated Committee on Research Priorities for Airborne Particulate Matter and the Committee on Air Quality Management in the United States. He has previously served on five other NRC committees.

Professor Hopke received his B.S. in Chemistry from Trinity College (Hartford) and his M.A. and Ph.D. degrees in chemistry from Princeton University. After a post-doctoral appointment at M.I.T., he spent four years as an assistant professor at the State University College at Fredonia, NY. Dr. Hopke then joined the University of Illinois at Urbana-Champaign, and subsequently came to Clarkson in 1989 as the Robert A. Plane Professor with a principal appointment in the Department of Chemistry. He has served as Dean of the Graduate School, Chair of the Department of Chemistry, and Head of the Division of Chemical and Physical Sciences before he moved his principal appointment to the Department of Chemical Engineering in 2000. In 2002, he became the Bayard D. Clarkson Distinguished Professor and Director of the Center for Air Resources Engineering and Science.

Dr. Hopke's recent and current grant and other contract support includes consulting on scientific and technical matters related to: particulate matter, particle monitoring, semi-volatile pollutants, vapor nucleation, EPA Supersites, sources of PCBs, regional air quality monitoring, and computational fluid dynamic modeling in humans for the Federal government (EPA and the National Institute for Occupational Safety and Health [NIOSH]), state and regional agencies (LADCO, NYSERDA, NJDEP, Cal ARB, Delaware DNREC), U.S. Department of Energy (DOE), International Atomic Energy Agency (IAEA), the Electric Power Research Institute (EPRI), and the National Science Foundation (NSF).

Dr. Dan Jaffe

Dr. Dan Jaffe is a Professor of Environmental Science at the University of Washington-Bothell, where he is coordinator for the University's degree program in Environmental Science. He is also an Adjunct Professor, Environmental Science and Regional Planning, Washington State University, and an Adjunct Professor of Atmospheric Sciences, University of Washington-Seattle. Dr Jaffe holds a B.S. in chemistry (1979) from the Massachusetts Institute of Technology (MIT); he received his M.S. and Ph.D. degrees in Chemistry from the University of Washington in 1983 and 1987, respectively.

Dr. Jaffe's areas of expertise, and research activities and interests are: urban, regional and global smog (air quality); atmospheric chemistry and ozone photochemistry; measurement of trace species in the atmosphere; trends in North American ozone and other trace species; transport and deposition of pollutants; and long-range transport of pollutants in the Pacific. He is the author of more than 80 publications on ozone, aerosols, mercury and other air pollutants, including several papers on the influence of background sources on regional and urban air quality.

Dr. Jaffe has served: on review panels and as a proposal reviewer for National Science Foundation (NSF), NASA, NOAA, EPA, the Israeli Science Foundation, Japanese Science agencies and other agencies; as a participant on a NASA blue ribbon panel on NO_y (nitrogen oxide) measurements; as a panel reviewer for NASA's Hong Kong monitoring program; as a

reviewer for scientific journals, including *Science*, the *Journal of Geophysical Research*, *Environmental Science and Technology*, *Atmospheric Environment* and others. In addition, he has served: as co-chair of the International Global Atmospheric Chemistry-Atmospheric Chemistry Education (IGAC-ACE-Ed) program; as chair of IGAC-ACE-Ed workshops in Brazil and Argentina on atmospheric measurements; as the coordinator for the University of Washington-Bothell's Bachelor of Science degree in Environmental Science; and on the State of Alaska and U.S. delegate to the inter-governmental Arctic Monitoring and Assessment Program (1991-1995).

Dr. Jaffe has been the Principal Investigator on 16 projects (since 1988) funded by NSF, NOAA, EPA, the National Park Service, the USGS, the State of Alaska, the Olympic Clean Air Agency (Olympia, Washington) and the Research Corporation. Currently, he has research projects funded by the EPA, NSF, and the National Park Service, is also a consultant for the Coordinating Research Council.

Dr. Michael T. Kleinman

Dr. Michael Kleinman is a Professor in the Department of Community and Environmental Medicine, College of Medicine, University of California, Irvine (UCI), and an Adjunct Professor of Social Ecology. In addition, he is the co-Director of the Air Pollution Health Effects Laboratory and Faculty Member of the UCI Center for Occupational and Environmental Health. Dr. Kleinman holds a B.S. in Chemistry from Brooklyn College, City University of New York (1965), an M.S. in Chemistry from the Polytechnic Institute of Brooklyn (1971), and a Ph.D. in Environmental Health Sciences from New York University (1977).

Dr. Kleinman has been studying the health effects of exposures to environmental contaminants found in ambient air for more than 25 years. His research program examines the mechanisms by which inhaled toxic chemicals, alone and in mixtures, interfere with the cardiopulmonary system and with respiratory system defenses, using both laboratory animals and human subjects. Dr. Kleinman has studied the effects of ozone, alone and in combination with particles, with human volunteers as well as in animal models. His current studies focus on injury-induced oxidative stresses from endogenous and exogenous factors that can cause asthma, cardiopulmonary injury and exacerbate lung and heart diseases, and on the cardiopulmonary effects of concentrated ambient ultrafine, fine and coarse particles using geriatric rats and a mouse model of allergic airways disease.

Prior to joining the faculty at UCI in 1982, Dr. Kleinman directed the Aerosol Exposure and Analytical Laboratory at Rancho Los Amigos Hospital in Downey, CA. He has published 70 articles in peer-reviewed journals dealing with the uptake and dosimetry of inhaled pollutants in humans and laboratory animals, and effects on cardiopulmonary and immunological systems after controlled exposures to ozone and other photochemical oxidants, carbon monoxide and ambient or laboratory-generated aerosols. He recently chaired a National Academy committee to examine issues in protecting deployed U.S. military forces from the effects of chemical and biological weapons.

Dr. Kleinman is a consultant to the EPA Science Advisory Board (Health Effects Subcommittee) and currently serves as the Chair of the California Air Quality Advisory Committee, which

reviews California's air quality criteria documents. He is a member of the Air and Waste Management Association, the American Association for the Advancement of Science (AAAS), the American Association for Aerosol Research, the American Chemical Society (ACS), Sigma Xi, and the New York Academy of Sciences.

Dr. Kleinman's sources of recent grant and/or other contract support funding include NIH, California Air Resources Board (CARB), U.S. EPA (Southern California Particle Center and Supersite), and the California EPA.

Dr. Allan Legge

Dr. Allan Legge is currently President of Biosphere Solutions, an environmental consulting firm located in Calgary, Alberta, Canada. Prior to forming Biosphere Solutions in 1993, he was a Senior Research Scientist at the Kananaskis Center for Environmental Research at the University of Calgary from 1972 to 1990, and a Senior Research Officer in the Environmental Research and Engineering Department, Alberta Research Council from 1990 to 1993.

Dr. Legge holds a B.A. in Biology and Dramatic Arts which was received from Whitman College, Walla Walla, Washington in 1965, and a Ph.D. in Plant Genetics/Ecology from Oregon State University in Corvallis, Oregon in 1971. His areas of specialization are environmental toxicology/atmospheric chemistry, and he focuses on the evaluation and assessment of the effects of the air pollutants SO₂, O₃, H₂S, NO_x, HF, PM and saline aerosols on forests and agricultural ecosystems.

Dr. Legge has been a member of the EPA Science Advisory Board since 1985 and has served on the following: (1) Forest Effects Review Panel (Co-Chair), 1985; (2) Scientific and Technological Achievement Awards Subcommittee (STAA), intermittently from 1986 to 2002; and (3) Clean Air Scientific Advisory Committee (CASAC) as a consultant since 1994 on Review Panels dealing with Nitrogen Oxides, Ozone and Related Photochemical Oxidants, and Particulate Matter. He served as a member of the U.S. National Research Council Committee to Assess the North American Research Strategy on Tropospheric Ozone (NARSTO) from 1997 to 2000. Dr. Legge is an active member of the Air & Waste Management Association (AWMA), the Alberta Society for Professional Biologists, and the International Air Pollution Workshop. He was elected as a Fellow of the American Association for the Advancement of Science (AAAS) in 1992, and a Fellow of the AWMA in 2002.

Dr. Legge's primary sources of recent grant and/or contract support have been from resource extraction industries (oil and gas; cement) in Canada, Alberta Environment (provincial government), non-governmental organizations and legal firms.

Dr. Morton Lippmann

Dr. Morton Lippmann is a Professor of Environmental Medicine at the New York University (NYU) School of Medicine. He holds a Ph.D. (NYU, 1967) in Environmental Health Science, an M.S. (Harvard University, 1955) in Industrial Hygiene, and a B.Ch.E. (The Cooper Union, 1954) in Chemical Engineering. At NYU, he directs a research program on Human Exposure and Health Effects, and the EPA-supported Particulate Matter Health Effects Research Center.

Dr. Lippmann's areas of expertise and interest include human environmental exposure assessment and associated health effects, respiratory tract dosimetry, aerosol science and technology, and risk assessment. He has been the recipient of numerous awards for his research and contributions in aerosol science and pulmonary physiology, human exposure assessment and dosimetry, chemical transformations in the atmosphere, population studies of exposure-response relationships in occupational and community cohorts, and factors affecting the toxicity of airborne fibers.

Much of this research has been focused on specific chemical agents, notably ozone, sulfuric acid, and asbestos. Dr. Lippmann is a past President of the International Society of Exposure Analysis (1994-1995), past Chairman of: the ACGIH (1982-1983); the EPA Science Advisory Board's Executive Committee (2000-2001); EPA's Advisory Committee on Indoor Air Quality and Total Human Exposure (1987-1993); and EPA's Clean Air Scientific Advisory Committee (1983-1987). He has also served on the NIOSH Board of Scientific Counselors and with the American Conference of Governmental Industrial Hygienists, and he has also chaired and been a member of numerous National Research Council committees, including committees on the airliner cabin environment and the health of passengers and crew, synthetic vitreous fibers, measurement and control of respirable dust in mines, indoor pollutants, toxicity data elements, and in-vivo toxicity testing of complex mixtures.

Dr. Lippmann's publications include over 275 research and review papers in the scientific literature and two reference texts on environmental health science. He is currently the Director of the EPA-supported Particulate Matter Health Effects Research Center at NYU and also of an EPA-Cooperative Agreement with NYU on personal exposure of respiratory disease patients to particulate matter in ambient air. Dr. Lippmann received PM Health Effects Research grants from EPA and NIEHS grants for Environmental Health Sciences research, as well as an EPA Cooperative Agreement: Personal Exposure to PM.

Dr. Roger O. McClellan

Dr. Roger O. McClellan received his DVM from Washington State University in 1960 and has more than 4 decades of experience in the fields of inhalation toxicology and risk assessment. He is the author of more than 350 papers and edited 10 books in these fields including the 2 leading texts on inhalation toxicology/respiratory toxicology. He is a Diplomate, by examination, of the American Board of Toxicology and American Board of Respiratory Toxicology and a Fellow of the Academy of Toxicological Sciences and Society for Risk Analysis. He currently is, or has been, an adjunct faculty member at 10 major research universities. Dr. McClellan is an elected member of the Institute of Medicine of the National Academy of Sciences.

Dr. McClellan currently works as an Advisor in Inhalation Toxicology and Human Health Risk Analysis from his home office in Albuquerque, NM. He divides his time between pro bono service and work for fee for service clients in government and the private sector. Dr. McClellan has served on numerous NRC Committees including Committee on Toxicology (Chair for 7 years), Committee on Environmental Justice, and the Committee that prepared "Science and Judgment in Risk Assessment." Dr. McClellan has served on numerous EPA Advisory Committees from the founding of EPA to the present under every EPA Administrator including: Chairing Environmental Health Committees and Clean Air Scientific Advisory Committee and

the committees that reviewed the Cancer Risk Assessment Guidelines promulgated in 1986 and proposed for promulgation in 2003. He has served on previous CASAC panels reviewing each of the Criteria Pollutants including ozone. Dr. McClellan is currently serving on an Advisory Committee to the CDC Center for Environmental Health Research and on the DOE's Biological and Environmental Research Advisory Committee.

Dr. McClellan is a strong proponent of integrating information from multiple sources: epidemiological studies, controlled human exposure investigations, laboratory animal bioassays and mechanistic investigations to assess human health risks. His expertise in inhalation toxicology, inhalation dosimetry modeling, carcinogenesis, comparative medicine, biologically-based dose-response modeling, and quantitative risk assessment are directly relevant to review of the science base for ozone.

Dr. Maria T. Morandi

Dr. Maria Morandi is an assistant professor of Environmental Sciences and Occupational Health at the School of Public Health of the University of Texas at Houston. She holds a BS degree in Chemistry from the City College of New York (1978), and MS (1981) and Ph.D. (1985) degrees in Environmental Sciences from the Norton Nelson Institute of Environmental Medicine of New York University. Dr. Morandi is also certified in Industrial Hygiene (CIH) by the American Board of Industrial Hygiene.

Dr. Morandi's areas of expertise include assessment of indoor, outdoor and personal air concentrations of airborne contaminants in community and occupational environments, development of methods for personal exposure monitoring of gas and particle-phase airborne chemicals, evaluation of the effects from exposure to airborne particles and ozone on human and murine alveolar macrophages, and effects from exposure to airborne particles, ozone, and air toxics in children with asthma. She has also performed statistical modeling of PM sources. Dr. Morandi is a current member of the Research Strategies Advisory Committee of the EPA Science Advisory Board (SAB), and the Board of Scientific Counselors (BOSC) of the National Toxicology Program (NIEHS). She is a member of the Chemical Exposures Working Group for the National Children Study (NCS) currently in the planning stages; this working group provides advice on exposure issues relevant to air pollutants and other environmental chemicals, including ozone, that may be important considerations for the NCS.

Dr. Morandi's sources of recent grant and/or other contract support funding include: (1) U.S. Environmental Protection Agency (several contracts on the use of passive dosimeters for monitoring indoor, outdoor and personal air concentrations of air toxics and a STAR grant on the effect of PM on murine and human alveolar macrophages); (2) the Mickey Leland National Urban Air Toxics Research Center (impact of exposure to airborne carbonyls, PM and ozone on children with asthma); (3) the Health Effects Institute (HEI) (a population-based exposure study); and (4) NIOSH (for training Industrial Hygienists).

Dr. Howard S. Neufeld

Dr. Neufeld is currently a full Professor in the Department of Biology at Appalachian State University, Boone, NC. Dr. Neufeld received his B.S. in Forestry from Rutgers University in

1975, his M.F. in Forest Sciences from the Yale School of Forestry and Environmental Science in 1977, and his Ph.D. in Botany from the University of Georgia in 1984. He was a post-doctoral fellow at New Mexico State University under Dr. Gary Cunningham from 1984-1985, working on the ecophysiology of range grasses and creosotebush. In 1985 Dr. Neufeld began an NRC post-doctoral appointment under Drs. Dave Tingey and Bill Hogsett at the EPA Lab in Corvallis, OR. While there, he worked on the effects of ozone on root growth of tree seedlings. After two years, Dr. Neufeld returned to the University of Georgia as a research coordinator in the Forestry School before accepting a position as Assistant Professor of Biology at Appalachian State University. Currently he is Professor of Biology and Past-President of The Association of Southeastern Biologists (ASB).

Dr. Neufeld's research expertise is in the area of plant physiological ecology, and has included work on desert plants and understory tree adaptations to shade. For the past 18 years, he has been active in air pollution effects research, including acidic deposition (rain and fog) studies on spruce trees and hardwoods of the eastern United States, and tropospheric ozone on native plants. From 1988-1992, Dr. Neufeld was the 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. These results have been published in a variety of journals, and additional papers are in preparation.

Dr. David Parrish

Dr. David D. Parrish has been a Research Chemist with the National Oceanic and Atmospheric Administration (NOAA) Aeronomy Laboratory since 1987. He holds a B.S. in Chemistry from Colorado College (1966) and a Ph.D. in Physical Chemistry from University of California, Berkeley (1970). Dr. Parrish was a Professor of Chemistry at Metropolitan State College, Denver, from 1975 to 1987 and at the University of Illinois at Chicago, from 1973 to 1975. In addition, he was a Postdoctoral Research Fellow in the Department of Chemistry, Harvard University, Cambridge, MA, from 1970 to 1973.

Dr. Parrish's research has focused upon the design, construction and operation of analytical instruments to measure trace constituents of the troposphere with the particular goal of understanding the ozone budget and other aspects of tropospheric photochemistry. He has participated in, planned, and led several field campaigns utilizing large, complementary suites of instruments from ground stations and aircraft platforms. These campaigns include the Southern Oxidant Study (SOS 1990, 1992, 1994, 1995, 1999), the North Atlantic Regional Experiment (NARE 1991, 1993, 1996, 1997), the 2000 Texas Air Quality Study, and the Intercontinental Transport and Chemical Transformation (ITCT 2002, 2004).

Dr. Parrish has coauthored over 100 peer-reviewed papers describing this work, and is included among the world's 295 highest cited authors in the geosciences (<http://isihighlycited.com/>). He was involved in the National Acid Precipitation Assessment Program, the NARSTO Tropospheric Ozone Assessment (coauthored two of the critical review papers), and the ongoing NARSTO Emission Inventory Assessment (lead author of chapter describing top-down assessments of current emission inventories), and is a member of the Scientific Steering Committee of the International Global Atmospheric Chemistry Program. Dr. Parrish is a member of the American Geophysical Union (AGU) and the American Association of the

Advancement of Science (AAAS). Dr. Parrish's salary and research are supported by NOAA base funding, independent of grants and/or other contract support.

Dr. Charles G. Plopper

Charles Plopper is currently a Professor in the Department of Anatomy, Physiology, and Cell Biology at the University of California, Davis, CA. He also serves as a Unit Leader (Respiratory Diseases Unit) and Director of the Inhalation Exposure Facility at the California National Primate Research Center. Dr. Plopper received a B.A. in Anthropology and Zoology (1967) and a Ph.D. in Anatomy/Cell Biology (1972) from the University of California, Davis. After completing his Ph.D., Dr. Plopper served as a biomedical research officer in the U.S. Army Medical Research Command in Denver and San Francisco. Subsequently, he held faculty positions at the University Of Hawaii School Of Medicine and the University of Kuwait School of Medicine, prior to joining the Laboratory of Pulmonary Function and Toxicology at the National Institute of Environmental Health Sciences. He has been on the faculty at the University of California, Davis, since 1979.

Dr. Plopper's research interests since beginning graduate school has been to define the cellular mechanisms and processes underlying the response of the respiratory system to environmental toxicants. Current projects include: establishment of a model of childhood environmental asthma using infant rhesus monkeys exposed to ozone and known human allergens; identification of mechanisms of enhanced susceptibility of neonates to bio-activated lung toxicants; definition of cellular mechanisms which prevent repair of toxic lung injury in neonates; definition of the role of glutathione pools in cellular protection from oxidant lung injury and the development of tolerance by repeated exposure. Portions of Dr. Plopper's research have been supported by the NIEHS, NHLBI, USEPA, NIAID, Health Effects Institute, and California Air Resources Board. Dr. Plopper is the author or co-author of over 250 original publications and review articles, and recently served as co-author for the book entitled: *The Lung: Development Aging and the Environment*. Dr. Plopper has served on a variety of governmental and private regulatory boards. He currently serves as a member of the Scientific Advisory Boards for the NHLBI Inner City Asthma Consortium and the NHLBI Center for Fetal Gene Therapy for Lung, Heart, and Blood Diseases, and is a member of the Scientific Review Panel on Toxic Air Contaminants and the Air Quality Review Committee for the for the CAEPA (Office of Environmental Health Hazard Assessment and Air Resources Board).

Dr. Armistead (Ted) G. Russell

Dr. Armistead (Ted) Russell is the Georgia Power Distinguished Professor and Coordinator of Environmental Engineering at the Georgia Institute of Technology. Professor Russell arrived at Georgia Tech in 1996 from Carnegie Mellon University, and has expertise in air quality engineering, with particular emphasis in air quality modeling, air quality monitoring and analysis. He earned his M.S. and Ph.D. degrees in Mechanical Engineering at the California Institute of Technology in 1980 and 1985, conducting his research at Caltech's Environmental Quality Laboratory. His B.S. is from Washington State University (1979).

Dr. Russell is currently on the National Research Council's Board of Environmental Studies and Toxicology, and has been a member of a number of the NRC committees, including chairing the Committee to Review EPA's Mobile Model and chairing the committee on Carbon Monoxide

Episodes in Meteorological and Topographical Problem Areas, and serving on the committee on Tropospheric Ozone Formation and Measurement, the committee on ozone forming potential of reformulated fuels and the committee on Risk Assessment of Hazardous Air Pollutants. Recently, he served on two EPA SAB subcommittees: the CASAC subcommittee on the National Ambient Air Monitoring Strategy (NAAMS) and the subcommittee on Air Quality Modeling Subcommittee of the Advisory Council on Clean Air Compliance Analysis. He was also a member of the EPA FACA Subcommittee on Ozone, Particulate Matter and Regional Haze, the North American Research Strategy for Tropospheric Ozone and California's Reactivity Science Advisory Committee. Previously he was on the EPA Office of Science, Technology and Policy's Oxygenated Fuels Program Review and various National Research Council program reviews, and a committee to review a Canadian NRC program.

Dr. Russell is a member of the Air and Waste Management Association, American Association for the Advancement of Science, American Society of Mechanical Engineering, Tau Beta Pi, Sigma Xi, and the American Association for Aerosol Research. He is Associate Editor of Environmental Science and Technology. Dr. Russell has won a variety of competitions for animations he has developed that depict the dynamics of pollutants have won a variety of prizes here and abroad, and his work was selected as a finalist for the prestigious Smithsonian Award for Computing in the Environmental Sciences. Recently, Prof. Russell led a multi-institutional effort to conduct air quality modeling of ozone, particulate matter and acid deposition to assist the Southern Appalachians Mountains Initiative to identify effective control strategies to improve air quality in Class I areas in the southern Appalachians. This work has been extended to detailed analysis of air quality strategies in Georgia, particulate matter modeling in the Southeast and Northeast, and development of a number of advanced numerical techniques for environmental modeling. For his service to National Research Council committees, he was recently selected as a National Associate of the National Academies.

Dr. Russell's funding comes from a variety of sources, including the FHWA (mobile source impacts on air quality), U.S. National Science Foundation (atmospheric modeling), NIH (air quality impacts on health), EPA (modeling, monitoring and field data analysis), DoD (biomass burning), various States (VOC reactivity, air quality modeling and field experimental studies) and state organizations, and the chemical (reactivity analysis), automotive (modeling) and utility (modeling, field studies) industries.

Dr. Joel Schwartz

Dr. Joel Schwartz is an Associate Professor in the Departments of Epidemiology and Environmental Health at the Harvard School of Public Health, and in the Department of Medicine at Harvard Medical School. He is also a faculty member in the Environmental Biostatistics Program at the School of Public Health. Dr. Schwartz received his B. A. (1969) and Ph.D. (1980) from Brandeis University. He is a member of the International Society for Environmental Epidemiology, and the American Thoracic Society.

Dr. Schwartz served as a member of the Center for Disease Control's Committee on Preventing Childhood Lead Poisoning from 1994 to 2002, and as a member of two National Research Council Committees (Committee on Assessing Lead Exposure in Critical Populations, Committee on Environmental Epidemiology). Dr. Schwartz was a recipient of a John D. and

Catherine T. MacArthur Fellowship, and a World Congress Award from the International Union of Environmental Protection Associations. His expertise is in epidemiology, biostatistics, and cost benefit analysis. Dr. Schwartz's major subject matters include air pollution and lead. His research has involved cross-sectional, time-series, cohort and panel studies of the acute and chronic health effects of air pollution, including both respiratory and cardiovascular endpoints, and he has a particular interest in questions of susceptibility.

In the last two years, Dr Schwartz received funding from the National Institutes for Health (NIH) for environmental biostatistics, for studies of aeroallergen exposure and asthma, for studies of lead, for a study of the association between particulate air pollution and heart attacks, and for a study of socioeconomic gradients in breast cancer. He has received funding from EPA as the PI for Epidemiology of the Harvard PM Research Center, and from the Health Effects Institute (HEI) for the APHENA project, which aims to combine North American and European time series analyses of air pollution, morbidity, and mortality.

Dr. Elizabeth A. (Lianne) Sheppard

Dr. Sheppard is a Research Associate Professor in the Department of Biostatistics, and the Department of Occupational and Environmental Health Sciences. She holds a Ph.D. (1992) in Biostatistics from the University of Washington. Her scientific interests include estimating the health effects of occupational and environmental exposures, air pollution health effects, air pollution epidemiology, observational study design, and group information in observational studies. She is an active member of the EPA Northwest Center for Particulate Matter and Health, as well as a collaborator on several occupational and environmental health studies. Her statistical methods research addresses the role of exposure and study design in estimating health effects from observational studies.

Dr. Sheppard just completed the project "Methods for Using Group Information in Epidemiology," an R29 grant funded by NIEHS. She was principal investigator (PI) on the sub-contract "Testing the Metals Hypothesis in Spokane" funded by the Mickey Leland Center, as well as PI on two sub-projects of the PM Center: "Statistics and Data Core," and "PM Statistical Methods." She is an external scientific reviewer for the Fresno Asthmatic Children's Environment Study based at University of California, Berkeley, and for the Environmental Lung Center at National Jewish in Denver.

Dr. Ira B. Tager (M.D.)

Dr. Ira Tager is currently a Professor of Epidemiology in the School of Public Health, University of California, Berkeley. He holds an B.A. from Colgate University (1965, summa cum laude); an M.D. from the University of Rochester (1969, with honors); and M.P.H. from the Harvard School (1973, with a concentration in epidemiology). For the past 30 years, Dr. Tager has conducted epidemiological studies on the effects of environmental pollutants on the occurrence of lung disease. Until 1993, the focus of this work was on second-hand tobacco smoke. Since that time, the emphasis has been on ambient air pollution.

Dr. Tager has published a number of papers on ozone-related health effects and effects of particulate matter (PM). In addition, he authored the section on health effects related to long-term exposure to ozone in the EPA's 1996 Air Quality Criteria Document for Ozone and Related

Photochemical Oxidants.” Dr. Tager has funded grants related to the health effects of ozone (NIH); PM and other pollutant effects on childhood asthma (California Air Resources Board [CARB]); effects in reduction of ambient pollutant levels over 20 on health in the LA Basin (CARB). He has contributed to the State of California Ozone Evaluation. Dr. Tager serves on the Research Committee for the Health Effects Institute and the advisory panel for PM for CARB; and has served as Chair of the Assembly on Occupational and Environmental Health of the American Thoracic Society.

Dr. George D. Thurston

Dr. George Thurston is an Associate Professor at the New York University (NYU) School of Medicine’s Department of Environmental Medicine. He received his Sc.D. from the Harvard University School of Public Health in 1983; his M.S. from the Harvard University School of Public Health in 1978; and his A.B. in Environmental Studies and his Sc.B. in Environmental Engineering from Brown University in 1974. With respect to his postdoctoral training, Dr. Thurston was a Research Fellow at the Harvard University Kennedy School of Government, Energy and Environmental Policy Center, from 1982-1984.

Dr. Thurston conducts epidemiological research into the human health effects of air pollution. He has published widely in the scientific literature regarding air pollution exposures and their human health consequences. Dr. Thurston presently serves as the Deputy Director of NYU’s U.S. EPA Particulate Matter (PM) Health Research Center. He is also the Director of the NYU-National Institute of Environmental Health Sciences (NIEHS) Community Outreach and Education Program, which aims to translate the NYU-NIEHS Center of Excellence expertise and resources to better inform the public about environmental problems. As part of his community service outreach, he has appeared on numerous national and international TV shows, including on C-SPAN, CNN, C-NBC, and NBC to discuss air pollution-related issues such as asthma, the Kuwait War fires, and the World Trade Center disaster. Dr. Thurston has also testified before both the U.S. Senate and the U.S. House of Representatives on multiple occasions regarding the human health effects of air pollution in the U.S.

Dr. Thurston is a member of the American Lung Association’s National Action Panel on Environment, the American Thoracic Society’s Environmental and Occupational Health Program Committee, and the International Society of Environmental Epidemiology. He has recently served on the New York State Air Management Advisory Committee to the N.Y. Department of Environmental Conservation and the National Academy of Sciences’ Committee on the Health Effects of Waste Incineration.

Dr. James S. Ultman

Dr. James Ultman is a Distinguished Professor, Department of Chemical Engineering and Department of Bioengineering, and Chair, of the Intercollege Graduate Degree Program in Physiology, at the Pennsylvania State University. Dr. Ultman earned his B.S. in Chemical Engineering (1965) from the Illinois Institute of Technology; and earned his M.S. (1967) and Ph.D. (1969) in Chemical Engineering, from the University of Delaware. He was an NIH Postdoctoral at the University of Minnesota from 1969-70.

Dr. Ultman's areas of expertise are: chemical engineering, biomedical engineering, respiratory physiology, the measurement and simulation of the respiratory dosimetry of ozone, and the quantification of ozone reaction with respiratory antioxidants.

Dr. Ultman's most-recent prior service on advisory committees includes: (1) Scientific Advisory Committee, CIIT Centers for Health Research, Research Triangle Park, NC, (2001-2003); (2) NIEHS Superfund Hazardous Substances Basic Research Program: Study Section Member (1999); (3) EPA Scientific Review Panel: Air Quality Criterion for Ozone (1993); (4) EPA Scientific Review Panel: Research Needs for Ozone (1996); (5) EPA and Basic Acrylic Monomer Manufacturers Workshop: Nasal Dosimetry-Issues and Approaches (1998); (6) EPA and Health Canada Review Panel: Formaldehyde-Assessment for Carcinogenicity (1998); and (7) NIH PPG Scientific Advisor: Mechanism of Heterogeneity in the Lungs, University of Washington (1998-present).

Dr. Ultman's sources of recent grant and/or other contract support funding include: (1) "Distribution of Chlorine in Intact Human Lungs" (grant title), Chlorine Institute, 1996-1998 (Sponsor/Dates); (2) "Ozone Exposure and Dose Delivered to Human Lungs," National Institutes of Health (NIH), 1998-2003; (3) "Distribution of Ozone in Intact Human Lungs: Effect of Intersubject Variability," Health Effects Institute, 1999-2001; and (4) "Mechanism of Species-Dependent Lung Injury," NIH, 2003-2006.

Dr. Sverre Vedal (M.D.)

Dr. Sverre Vedal is currently Professor in the Department of Environmental and Occupational Health Sciences, Division of Occupational and Environmental Medicine, at the University of Washington School of Public Health and Community Medicine. Dr. Vedal is a respiratory physician and an epidemiologist. He received his Doctor of Medicine degree from the University of Colorado and his Master of Science (M.Sc.) degree in epidemiology from the Harvard University School of Public Health. He worked for 18 years as an academic pulmonologist at the University of British Columbia in Vancouver, and then 3 years at the National Jewish Medical and Research Center in Denver, Colorado. Dr. Vedal serves as a standing member of the Review Committee of the Health Effects Institute (HEI). Additionally, he was a member of the HEI expert panel of the HEI-funded reanalysis of the Six Cities and American Cancer Society air pollution cohort studies, a member of the review committees for the HEI-funded National Morbidity, Mortality, and Air Pollution Study (NMMAPS) I and II, and now chairs the NMMAPS review committee. He also chaired the HEI committee that reviewed the revised time series analyses of EPA selected studies. Dr. Vedal served as a member of the Air Quality Management in the U.S. Committee of the National Research Council. In January 1998, he was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board and rotated off that committee in 2003.

Dr. Vedal's research is largely in the area of air pollution health effects. He has completed studies on effects of air pollution in panels of asthmatic children, children without asthma, patients with COPD, and patients at high risk of cardiac arrhythmias, as well as time-series studies of mortality, hospitalization and emergency room visits. Dr. Vedal is currently working

on incorporating source-oriented approaches to specifying exposure to ambient air pollution in epidemiological studies, and on identifying effects of chronic exposure to air pollution.

Dr. George Wolff

Dr. George Wolff is presently a Principal Scientist with the General Motors Public Policy Center. He holds a B.S. in Chemical Engineering from the New Jersey Institute of Technology (1969), an M.S. in Meteorology and Air Resources Management from New York University (1970), and a Ph.D. in Environmental Sciences (Water, Air and Waste Management) from Rutgers University (1974). Dr. Wolff was an Adjunct Professor, Department of Civil and Environmental Engineering, Michigan State University, from 1998 to 2000 and at the University of Michigan, School of Public Health, from 1991 to 1995.

Dr. Wolff has previously served as both a Member and Chair (1992-1996) of EPA's Clean Air Scientific Advisory Committee (CASAC), including the period during the CASAC conducted its previous iteration of National Ambient Air Quality Standard (NAAQS) reviews of ozone (1993-1996) and particulate matter (1994-1996). Dr. Wolff presently serves as a Consultant to the CASAC Particulate Matter Review Panel, and he has also served on numerous other CASAC panels and SAB committees, including the Research Strategies Advisory Committee (RSAC) (1992-1994), the Advisory Council on Clean Air Compliance Analysis (1995-1998), the Air Quality Modeling Subcommittee (1997-1998), and the Health and Ecological Effects Committee (1997-1998). Dr. Wolff is a fellow member of the Air & Waste Management Association and a member of the American Meteorological Society and the American Association of the Advancement of Science (AAAS).

Dr. Wolff's other professional advisory activities and associations include: National Research Council (NRC), Committee to Review the U.S. Department of Energy (DOE), Office of Fossil Energy, Research Plan for Fine Particulates (1999-2000); Health Effects Institute (HEI), Advisory Board for the Epidemiology Reanalysis Project (1998-2001); University of Michigan, School of Public Health, External Advisory Committee for the Michigan Center for the Environment and Children's Health (1998-present); reviewer for various EPA, EPRI and HEI research programs (1979-present); California Air Resources Board (CARB) Management Advisory Group for the Southern California Air Quality Study (SCAQS) and CARB Emissions Working Group for the Southern California Air Quality Study (1985-1991); CARB Statewide Modeling Coordination Group (1989-1991); Michigan Department of Natural Resources' Southeast Michigan Ozone Modeling Committee, (1989-1990); Lake Michigan Ozone Study (LMOS) Advisory Committee (1990-present); and the Southeast Michigan Ozone Study (SEMOS) Management Committee (1992-present).

Dr. Wolff receives no funding outside of General Motors.

Dr. Judith Zelikoff

Dr. Judith Zelikoff is currently a tenured Associate Professor in the Department of Environmental Medicine at the New York University School of Medicine. She holds an M.S. in microbiology (1976) from Fairleigh Dickinson University (Teaneck, NJ) and a Ph.D. in experimental pathology (1982) from the University of Medicine and Dentistry of New Jersey. Upon award of the degree, Dr. Zelikoff was an NIH trainee with Dr. Morton Lippman in the

Department of Environmental Medicine at NYU School of Medicine. Her postdoctoral training in toxicology was supported by a Fellowship from the National Heart, Lung, and Blood Institute (NHLBI). After two years of post-doctoral training, she assumed a research faculty position at NYU.

Dr. Zelikoff's areas of expertise are: (1) pulmonary immunotoxicology (characterization of inhaled metal (i.e., cadmium, chromium), gaseous and particulates (ozone, sulfuric acid), and airborne pollutant mixtures (i.e., woodsmoke, cigarette smoke, ambient particulate matter) on pulmonary immune defense mechanisms and host resistance against infectious disease); (2) environmental toxicology/ecoimmunotoxicology (effects of aquatic pollutants on the immune responses of fish, development of immune biomarkers, and alternative animal models for immunotoxicological studies); and (3) developmental immunotoxicology (effects of prenatal chemical exposures on immune defense mechanisms of the neonate). She is currently on two National Academy of Sciences (NAS) Committees, one of which is examining the effects of Gulf War Chemicals on Soldier Health (IOM), and the other on guidelines for exposure to spacecraft water (NRC).

Dr. Zelikoff's recent grant support funding includes: the National Institute of Occupational Safety and Health (NIOSH; Role of Ozone in Chromium Carcinogenicity) (1999-2003); National Institute of Environmental Health Sciences (NIEHS; Role of Cytokine Metabolism in Ozone Immunotoxicity) (2001-2003); EPA (Role of PM-associated Metals in Exacerbating Infectious Pneumonia) (1999-2004); the U.S. Army Biomedical Research Development Laboratories (1992-2003); the Hudson River Foundation (2003-2004); and Philip Morris Inc. (2001-2005). She also has over 70 peer-reviewed publications and over 20 book chapters in the area of immunotoxicology and serves either as associate editor or editorial board member of 10 journals including Toxicology and Applied Pharmacology, Toxicology, and Journal of Toxicology and Environmental Toxicology.

Dr. James V. Zidek

Dr. Jim Zidek is a Professor of Statistics, in the Department of Statistics, at the University of British Columbia. His areas of expertise include: environmetrics; mapping spatial pollution fields; designing environmental monitoring networks; environmental health risk analysis. Dr. Zidek received his B.Sc. (with honors) and M.Sc. from the University of Alberta in 1961 and 1963, respectively. He was awarded his Ph.D. from Stanford University in 1967. Selected distinctions for Dr. Zidek include: Fellowships for the American Statistical Association and the Institute of Mathematical Statistics; the Izaak Walton Killam Senior Fellowship, 1989/90, and the Izaak Walton Killam Research Prize, 2001; the Distinguished Achievement Medal, Environmental Statistics Section of the American Statistical Association, 2000; and the Gold Medal, Statistical Society of Canada, 2000. He is also an Elected Fellow, Royal Society of Canada, 2003.

Dr. Zidek's leadership positions include: founding Head of Statistics (1984-89); Head of Statistics (1997-2002); President, Statistical Society of Canada (1988); Chair, Statistical Sciences Grant Selection Committee; Natural Sciences and Engineering Research Council of Canada (NSERC), (1980); Mathematical Sciences Group Chair, NSERC (1988-91); Editor, *Statistical Science*, 1987-92; Editor, CRC/Chapman Hall, 1998-present; and Editor, *Encyclopedia of*

Environmetrics, 1999-present. Since 1999, he has served on the advisory committee for EPA's Northwest Research Center for Particulate Air Pollution and Health, at the University of Washington. He also served on the Methodological Advisory Committee, Statistics Canada, from 1985 to 1987, and from 1991 to 1994; and on the Councils, Institute of Mathematical Statistics (1996-99) and International Society of Bayesian Statistics (1996-98).

Dr. Zidek's recent sources of grant and other contract support include: (1) ManTech Corp., Interpolating PM_{2.5} fields, \$35,000, 00/01; (2) NSERC, Likelihood theory and spatial mapping, \$30,000 p.a., 2002-2006; and EPSRC of the UK, Predicting personal exposure to PM₁₀, 5000 pounds, 2002.

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Henderson, Rogene Chair

Lovelace Respiratory Research Institute

Dr. Rogene Henderson is currently the Director of the Lovelace Respiratory Symposium at the Lovelace Respiratory Research Institute. Dr. Henderson earned her Ph.D. in chemistry from the University of Texas in 1960 and her B.S./B.A. in Chemistry from Texas Christian University in 1955. She was a Fulbright Scholar in Physical Chemistry in 1955-1956 and held fellowships at the Universities of Texas and Arkansas. Dr. Henderson's research interests are in three major areas: (1) biochemistry of the lung, particularly the surfactant lining layer – she has developed in vivo screening tests for pulmonary toxicants based on analysis of bronchoalveolar washings for biomarkers of lung injury and repair; (2) the mechanisms by which pulmonary inflammation leads to repair or to chronic disease (fibrosis, emphysema); and, (3) the pharmacokinetics of inhaled xenobiotics (particularly vapors) and chemical-specific biomarkers of chemical exposure. In October 2004, she was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as the Chair of the Clean Air Scientific Advisory Committee (CASAC). Dr. Henderson is currently a member of: the U.S. Army Deployment Toxicology Science Working Group; the Health Effects Institute Research Committee; the National Research Council/National Academy of Sciences' Board on Environmental Studies and Toxicology; and, the American Cancer Society Advisory Group on Cancer and the Environment. Past advisory committee activities for Dr. Henderson include: invited member of the January 1995 National Toxicology Program Workshop on "Mechanism-Based Toxicology in Cancer Risk Assessment: Implications for Research, Regulation and Legislation;" member of the World Health Organization Advisory Group on Use of Biological Markers in Risk Assessment (1989, 1992); member of the Ad Hoc Advisory Group on Biologic Markers for EPA Science Advisory Board, Environmental Health Committee (1989); member of the NAS/NRC Subcommittee on Guidelines for Estimating Acceptable Acute Exposures for Hazardous Substances (1990-1992); and, member of the Environmental Protection Agency's Science Advisory Board, Environmental Health Committee (1991-1995). Dr. Henderson's recent sources of funding include the Lovelace Respiratory Research Institute endowment, the U.S. Department of Defense and the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH).

Cowling, Ellis

North Carolina State University

Dr. Ellis B. Cowling is a University Distinguished Professor At-Large, Colleges of Natural Resources and Agriculture and Life Sciences, North Carolina State University (NCSU). He received his B.S. (Wood Technology, 1954) and M.S. (Forest Pathology, 1956) from the State University College of Forestry at Syracuse University; his Ph.D. (Plant Pathology/Biochemistry, 1959) from the University of Wisconsin; and his Filosofie Licensiat (1960) and Filosofie Doktor (1970) in Physiological Botany from the Institute for Physiological Botany, University of Uppsala (Sweden). Since 1995, Dr. Cowling has been a Visiting Eminent Scholar, School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA. From 1978 to 1991, he served as Associate Dean for Graduate Education and Research in the College of Forest Resources at NCSU. Dr. Cowling held an appointment as an Adjunct Fellow, Kennedy School of Government, Harvard University, from 1993 to 2000. Dr. Cowling is regarded as a world leader in air pollution research. He was elected to membership in the National Academy of Sciences (NAS) in 1973. Dr. Cowling is currently Director of the Southern Oxidants Study, a strategic alliance of 490 scientists in 40 universities and 42 federal, state, and industrial organizations that investigate the chemistry, meteorology, biology, and management of ozone and particulate matter pollution and its public health and ecological effects in the southeastern United States. During a sabbatical year in Sweden in 1970-1971, he shifted his personal research to "acid rain" and other aspects of the chemical climatology and biological impacts of airborne chemicals on terrestrial and aquatic ecosystems in North America and Europe. From 1975 to 1983, Dr. Cowling provided leadership for development of the National Atmospheric Deposition Program (NADP); this Interregional Research Program (IR-7) involves more than 200 scientists in the United States and Canada. NADP continues to provide the only reliable continent-scale maps of precipitation chemistry for the United States. In 1978-1979, at the request of the President's Council on Environmental Quality (CEQ), he was one of four scientists who developed the original draft plan for the National Acid Precipitation Assessment Program (NAPAP). This 10-year, multi-agency research and assessment program involved more than 500 scientists who provided the scientific foundation for important parts of the Clean Air Act Amendments (CAA) of 1990. Dr. Cowling's current research interests are in the changes in the chemical climate of industrial regions and their effects on aquatic and terrestrial ecosystems, as well as the use of scientific and engineering knowledge in public decision-making. Dr. Cowling was appointed to the NAS/NAE/IOM/NRC Committee on Science Engineering and Public Policy from 1995 to 1998, and he was elected to the Council of the National Academy of Sciences, from 1994 to 1997. Dr. Cowling's other honors and awards include: the Alexander Quarles Holladay Medal for Excellence in Contributions to North Carolina State University, 2002; the Barrington Moore Memorial Award for Biological Research, Society of American Forester, 2000; recipient of the Oliver Max Gardner Award of the Consolidated University of North Carolina for "contributions to the welfare of the human race," 1981; recipient of the North Carolina Award of Achievement in Science, 1972; and election as a Fellow of the International Academy of Wood Science (Vienna), 1971. Dr. Cowling is the co-author of two books, and has 341 publications in referenced journals and other scientific contributions.

Crapo, James

National Jewish Hospital and Medical Research Center

Dr. James Crapo is the Chairman, Department of Medicine; and Professor of Medicine at the National Jewish Medical and Research Center (NJMRC) in Denver, CO. In addition, he is the Chief Executive Officer (CEO) of Aeolus Pharmaceuticals, Inc. Dr. Crapo is also a Professor of Medicine and the Director of Ph.D. Programs for Graduate Health Care Professionals at the University of Colorado Health Sciences Center. He received his B.S. in Chemistry from Brigham Young University (1967) and his M.D. from the University of Rochester (1971). Prior to coming to NJMRC in 1996, Dr. Crapo spent over 15 years as the Chief of the Pulmonary and Critical Care Medicine Division at Duke University Medical Center. Throughout his professional career, Dr. Crapo has been active in numerous professional societies, including service on the National Heart, Lung and Blood Institute (NHLBI) Advisory Council and serving as President of the American Thoracic Society. He is also a member of the American Physiological Society, the American Society for Clinical Investigation, the Fleischner Society (where he is also President-elect), the Association of American Physicians, and the Society of Toxicology. In addition, Dr. Crapo is a Fellow of the American College of Chest Physicians, the American College of Physicians, and the Royal College of Physicians, Edinburgh, Scotland. He was a Consultant to the Ozone Review Panel of EPA's Clean Air Scientific Advisory Committee (CASAC) from 1984-1990. Dr. Crapo has maintained a large research program and has numerous grants on which he is the principal investigator. His current grants, all with the National Institutes of Health (NIH), are as follows: (1) "Program Project: Acute Lung Injury and Repair" (1984-2004), Program Director; (2) "Advanced Training for Clinical Investigators" (1999-2004), Principal Investigator; and (3) "Collaborative Program in Bronchopulmonary Dysplasia: Treatment of BPD Using Mimetics for Superoxide Dismutase" (1999-2007), Principal Investigator. Dr. Crapo is the holder of four U.S. Patents, with five other Patents pending, and has in excess of 200 publications. Dr. Crapo is one of the Co-Founders of Aeolus Pharmaceuticals, Inc., a biotech firm directed at the development of small molecular weight antioxidant mimetics to control inflammation-related disease processes. Dr. Crapo has had laboratory research support provided by Aeolus. The biotechnology support is to study the efficacy of metalloporphyrin antioxidants in animal models of disease, compounds that have not yet been approved for human use. Effective July 1, 2004, Dr. Crapo became CEO of Aeolus Pharmaceuticals, Inc.

Hopke, Philip Past CASAC Chair

Clarkson University

Dr. Philip K. Hopke is the Bayard D. Clarkson Distinguished Professor at Clarkson University and the Director of the Center for Air Resources Engineering and Science. In October 1997, he was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC). Dr. Hopke is the outgoing Chair of the CASAC, and he also chairs the CASAC Ambient Air Monitoring and Methods (AAMM) Subcommittee. In addition, he serves as an Science Advisory Board (SAB) Member. Professor Hopke is the current President of the American Association for Aerosol Research, and is a member of the National Research Council's Congressionally-mandated Committee on Research Priorities for Airborne Particulate Matter and the Committee on Air Quality Management in the United States. He has previously served on five other NRC committees. Professor Hopke received his B.S. in Chemistry from Trinity College (Hartford) and his M.A. and Ph.D. degrees in chemistry from Princeton University. After a post-doctoral appointment at M.I.T., he spent four years as an assistant professor at the State University College at Fredonia, NY. Dr. Hopke then joined the University of Illinois at Urbana-Champaign, and subsequently came to Clarkson in 1989 as the Robert A. Plane Professor with a principal appointment in the Department of Chemistry. He has served as Dean of the Graduate School, Chair of the Department of Chemistry, and Head of the Division of Chemical and Physical Sciences before he moved his principal appointment to the Department of Chemical Engineering in 2000. In 2002, he became the Bayard D. Clarkson Distinguished Professor and Director of the Center for Air Resources Engineering and Science. Dr. Hopke's recent and current grant and other contract support includes consulting on scientific and technical matters related to: particulate matter, particle monitoring, semi-volatile pollutants, vapor nucleation, EPA Supersites, sources of PCBs, regional air quality monitoring, and computational fluid dynamic modeling in humans for the Federal government (EPA and the National Institute for Occupational Safety and Health [NIOSH]), state and regional agencies (LADCO, NYSERDA, NJDEP, Cal ARB, Delaware DNREC), U.S. Department of Energy (DOE), International Atomic Energy Agency (IAEA), the Electric Power Research Institute (EPRI), and the National Science Foundation (NSF).

Miller, Frederick J.**Chemical Industry Institute of Toxicology**

Dr. Fred Miller is currently Vice President for Research at CIIT Centers for Health Research (CIIT). He has been at CIIT since February, 1991. Dr. Miller received a B.A. and M.S. in Statistics from the University of Wyoming. In 1968, he began a career as a commissioned officer in the U.S. Public Health Service (PHS). As a mathematical statistician involved with the design and analysis of studies on the effects of air pollutants on animals, Dr. Miller became interested in the use of such studies for assessing human health risks. He was assigned to the U.S. Environmental Protection Agency (EPA) when it was created in 1970. In 1971, Dr. Miller received an EPA long-term training award, which led to his doctoral research on the transport and removal of ozone in the lungs of animals and man. He received his Ph.D. in Statistics from North Carolina State University in 1977. During his career with EPA, Dr. Miller served as Director of the Health Effects Research Laboratory's Inhalation Toxicology and Environmental Toxicology Divisions. He was the senior author of the paper that established EPA's policy for considering inhalable particles of potential health concern to be those less than 15 μm in aerodynamic diameter as opposed to total suspended particulate matter. Dr. Miller was heavily involved in Agency activities leading to the development of the PM10 primary standards in 1987. Upon retirement from the PHS in 1989, Dr. Miller joined the faculty of Duke University Medical Center, continuing his long-standing interest in extrapolation modeling through his capacity as an Associate Director of the Duke Center for Extrapolation Modeling. Dr. Miller is interested in developing and implementing research strategies and projects that permit increased utilization of animal toxicological results to evaluate the likelihood of human risk from exposure to inhaled chemicals. His primary research interests include pulmonary toxicology, respiratory tract dosimetry of gases and particles, lung physiology and anatomy, extrapolation modeling, and risk assessment. Dr. Miller is internationally recognized for his research on the dosimetry of reactive gases. He is active in professional societies and consulting on environmental health issues. The author or co-author of more than 150 publications, Dr. Miller received a number of Scientific and Technical Achievement awards from EPA and is the recipient of the PHS' Outstanding Service Medal. He served as an ad hoc consultant to the EPA's Science Advisory Board and Clean Air Scientific Advisory Committee (CASAC) prior to being appointed in October 2000 as a CASAC member. Dr. Miller has also been an advisor to various other public organizations and currently chairs the Science Advisory Committee for the National Jewish Medical and Research Center's (Denver, Colorado) Environmental Lung Center. Dr. Miller is currently the Principal Investigator on a contract with Bepak, Europe, LT, for the conduct of respiratory dosimetry research aimed at targeting drug delivery to the respiratory tract via the nose.

Poirot, Richard L.

Vermont Agency of Natural Resources

Mr. Richard L. Poirot has worked as an environmental analyst in the Air Quality Planning section of the Vermont Department of Environmental Conservation since 1978. His responsibilities include developing the technical support for State Implementation Plans (SIPs) to ensure attainment and maintenance of Federal and State standards for ozone, particulate matter, and regional haze. Given the rural nature and northeasterly location of Vermont, the influence of regional-scale pollution transport is of particular interest. Lacking sophisticated atmospheric chemistry modeling expertise and resources, Mr. Poirot has also developed interests in drawing inference on the nature of pollution sources from analysis of ambient measurement data, and in working in collaborative regional scientific of science/policy forums. For example, he is or has been a participant on Ambient Monitoring and Assessment Committee for the Northeast States for Coordinated Air Use Management, the Data Analysis workgroup for the Ozone Transport Assessment Group, the Science and Technical Support Workgroup for the FACA Subcommittee on Ozone, Particulate Matter and Regional Haze, the Monitoring and Data Analysis Workgroup for the Mid Atlantic/Northeast Visibility Union (MANE-VU), the EPA PM-2.5 Data Analysis workgroup, the Steering Committee for the Interagency Monitoring of Protected Visual Environments, and the US/Canada (Air Quality Agreement) Subcommittee on Scientific Cooperation. Mr. Poirot holds a B.A. degree from Dartmouth College, where he majored in geography and environmental studies. In November 2001, he was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board.

Speizer, Frank

Harvard Medical School

Dr. Frank E. Speizer is currently Edward H. Kass Professor of Medicine at the Channing Laboratory of the Harvard Medical School, Boston, MA. Since 1988, he has also served as Co-Director of the Channing Laboratory. Dr. Speizer also holds hospital appointments as a senior physician in the Department of Medicine at Brigham and Women's Hospital, Boston; MA and as senior physician in the Department of Medicine at Beth Israel Deaconess Medical Center, Boston. Dr. Speizer received his Bachelor of Arts (A.B.) degree from Stanford University in 1957, and his Doctor of Medicine (M.D.) from the Stanford University Medical School in 1960. He also holds an honorary Master of Arts (A.M.) degree from Harvard University, which was awarded in 1989. Prior to his current appointment at the Channing Laboratory, Dr. Speizer served as Associate Professor of Epidemiology (Physiology) at the Harvard School of Public Health, Boston (1978-1986), and as Associate Professor of Medicine, Harvard Medical School (1978-1986). Since 1986, he has served as both Professor of Medicine at the Harvard Medical School and as Professor of Environmental Sciences at the Harvard School of Public Health. Dr. Speizer's major committee assignments include serving as: Executive Committee, Dana Farber/Harvard Cancer Center, Boston (1998); Co-Chair, American Thoracic Society Questionnaire Revision Committee (1999); Member, Honors Committee, Harvard Medical School (2002); and Chair, Search Committee for Pulmonary Division Chief, Brigham and Women's Hospital. In October 2001, Dr. Speizer was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board. His major professional society involvement includes serving as a Member of the International Society for Infectious Diseases and the American Thoracic Society, National Asthma Research Committee; and as Associate Editor for Environmental Research. Dr. Speizer's awards and honors include: Honorary Fellow, American College of Epidemiology (2000); World Lung Health Award, American Thoracic Society (2000); Member, Institute of Medicine, National Academy of Sciences (2001); Excellence in Women's Health Award, Jacobs Institute of Women's Health (2001); the Charles S. Mott Prize, General Motors Fund for Cancer Research (2001); and the Excellence in Women's Health Award, Brigham and Women's Hospital (2001). An epidemiologist, Dr. Speizer's major research interests are environmentally- and occupationally-related acute and chronic diseases; the natural history of chronic obstructive lung disease; and epidemiologic studies of risk factors for cancer, heart disease and diabetes. He is extensively published in his disciplinary field of expertise.

Zielinska, Barbara

Desert Research Institute

Dr. Barbara Zielinska currently holds the position as Research Professor and Director of the Organic Analytical Laboratory at the Division of Atmospheric Sciences of the Desert Research Institute (DRI) in Reno, Nevada. The DRI is an autonomous research division of the University and Community College System of Nevada (UCCSN). DRI was created in 1959 by a special act of the Nevada State Legislature. Under the act and subsequent actions of the University Board of Regents, DRI is charged with conducting basic and applied research in environmental science. The institute employs more than 400 professional, technical, and support staff. Dr. Zielinska has been active in the air pollution field for more than 20 years and specializes in the analysis of organic compounds in ambient air and in emission sources. Her list of publications includes over 80 papers concerning the analysis of ambient and source samples for polycyclic organic hydrocarbons (PAH), nitro-PAH and other toxic air pollutants. She is currently the principal investigator of the following grants and contracts: Section 211(b) tier 2 high-end exposure screening study of baseline and oxygenated gasoline (funded by the American Petroleum Institute); chemical characterization of the exhaust from heavy-duty diesel vehicles to evaluate the performance of diesel technology options, including fuel and catalyst (funded by DOE/NREL, SCAQMD and BP/ARCO); chemical characterization of heavy-duty vehicles, tested on chassis dynamometer (Coordinating Research Council); and the characterization of chemical composition and ambient concentrations of particulate and semi-volatile organic compounds for the California Regional PM_{2.5}/PM₁₀ Air Quality Study (CRPAQS). Dr. Zielinska's recently completed research projects include: detailed chemical characterization of diesel and gasoline exhaust for the DOE/NREL comparative toxicity study; apportionment of diesel emissions in underground mines where heavy-duty diesel equipment is used and assessment of miner's exposures to these emissions (funded by the Health Effects Institute); chemical analyses of collected diesel particulate matter samples in the CRC E-43 project (DOE/NREL); and analysis of speciated volatile organic compounds for the 2000 Central California Ozone Study and 1997 Southern California Ozone Study-NARSTO (CARB). Dr. Zielinska received her M.Sc. degree from the Lodz University of Technology, Poland, and her Ph.D. degree from the Polish Academy of Sciences, both in Chemistry. In May 2001, she was appointed by the Administrator of the U.S. Environmental Protection Agency (EPA) as a member of the Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board.