

Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States

Committee

Joe W. Gray

Chair

Joe W. Gray is Gordon Moore Professor, Department of Biomedical Engineering, and Associate Director for Biophysical Oncology, Knight Cancer Institute. He applies 'omic and imaging technologies to elucidate mechanisms by which cancers become resistant to treatment and uses this information to develop therapeutic strategies to more durably control advanced cancers. He also serves on the Board of Counselors for the Radiation Effects Research Foundation. Dr. Gray has a BS in engineering physics from Colorado School of Mines (1968) and a PhD in physics from Kansas State University (1972), respectively. Dr. Gray is a member of the National Academy of Medicine.

Simon D. Bouffler

Member

Simon D. Bouffler is Head of Radiation Effects Department at Public Health England's Centre for Radiation, Chemical and Environmental Hazards in the UK (note that PHE will become part of the UK Health Security Agency as of 1 October 2021). He has over 30 years' experience in radiation protection research and has responsibility for epidemiological and experimental research related to radiation risk; this includes both ionizing and non-ionizing radiations and ultra-violet light. He has wide ranging research interests on the mechanisms of radiogenic diseases, particularly at low doses and low dose rates of exposure, with over 120 relevant peer reviewed publications. He was awarded a BSc (1981) and PhD (1984) in biology from the University of Southampton, UK. He has been involved in many radiation protection research projects and provided leadership on stakeholder engagement for the EU CONCERT project. He is Chair of the MELODI Strategic Research Agenda working group and coordinated the RISK-IR project that investigated the effects of ionizing radiation, particularly at low doses, on stem cell function. He has served as UK representative to the United Nations Scientific Committee on the Effects of Atomic Radiation since 2015 having worked for the Committee since 2008, additionally since 2017 he serves on the Main Commission of the International Commission on Radiological Protection. In 2018 he was awarded the Weiss Medal by the UK Association for Radiation Research.

Shaheen A. Dewji

Member

Shaheen A. Dewji is an Assistant Professor in the Nuclear and Radiological Engineering and Medical Physics Programs in the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology. Prior, Dr. Dewji was a faculty member in Department of Nuclear Engineering at Texas A&M University and a Faculty Fellow of the Center for Nuclear Security Science and Policy Initiatives. In her preceding role at Oak Ridge National Laboratory (ORNL), Dr. Dewji was Radiological Scientist in the Center for Radiation Protection Knowledge, where her recent work has included assessment of patient release criteria for nuclear medicine patients, as well as development of dose coefficients associated with the external exposure and internal uptake of radionuclides due to environmental or nuclear security exposures. Dr. Dewji completed her M.S. (2009) and Ph.D. (2014) degrees in Nuclear and Radiological Engineering at the Georgia Institute of Technology in Atlanta, GA, and is an alumni of the Sam Nunn Security Program. As a native of Vancouver, Canada, she received her Bachelor of Science in Physics from the University of British Columbia (2006). Since 2020, Dr. Dewji has served as a member of the National Academies of Science, Engineering, and Medicine – Nuclear and Radiation Studies Board and was member of the 2021 Panel on Review of Selected Research Areas at the Physical Measurement Laboratory of the National Institute of Standards and Technology.

Andrew P. Feinberg

Member

Andrew P. Feinberg studied mathematics and humanities at Yale in the Directed Studies honors program, and he received his B.A. (1973) and M.D. (1976) from the accelerated medical program at Johns Hopkins University, as well as an M.P.H. from Johns Hopkins (1981). He performed a postdoctoral fellowship in developmental biology at UCSD, clinical training in medicine at University of Pennsylvania, and genetics research and clinical training at Johns Hopkins. Dr. Feinberg is considered the founder of the field of cancer epigenetics, having discovered altered DNA methylation in cancer in the early 1980's with Bert Vogelstein. Over the decades since, Feinberg and his colleagues have shaped the landscape of our understanding of DNA methylation and other epigenetic changes, and their applications to epidemiology and medicine, and have introduced groundbreaking statistical and laboratory methods to the study of the epigenome. He and his colleagues discovered human imprinted genes and loss of imprinting (LOI) in cancer, and they proved the epigenetic hypothesis of cancer through their work on Beckwith-Wiedemann syndrome. Most recently, they pioneered genome-scale epigenetics (epigenomics), with the first NIH funded Epigenome Center, pioneering methods including the first comprehensive genome-scale methylation discovering the major target for epigenetic variation in humans, CpG island shores. He led the first whole genome bisulfite sequencing analysis of human cancer, discovering large hypomethylated blocks that correspond to nuclear lamina-associated heterochromatin, as well as a mechanism for disruption of these blocks in epithelial-mesenchymal transition. He has also helped to create the field of epigenetic epidemiology, discovering epigenetic mediation of genetic variants in disease. He has made several important theoretical contributions as well, including the epigenetic progenitor hypothesis of cancer and the role of entropy in epigenetic development and disease. He is a Bloomberg Distinguished Professor in the Johns Hopkins University Schools of Medicine, Engineering and Public Health, where he is Director of the Center for Epigenetics. He is a recipient of an NIH Director's Pioneer Award, is a member of the National Institute of Medicine, the American Academy of Arts and Science, the NIH Council of Councils, and he has received honorary doctorates from the University of Uppsala, the Karolinska Institute, and the University of Amsterdam.

Benjamin C. French

Member

Benjamin French is an associate professor of biostatistics in the Department of Biostatistics at Vanderbilt University and an expert advisor to the Department of Statistics at the Radiation Effects Research Foundation (RERF), where he previously served as senior scientist and interim department chief. He received his undergraduate degree in mathematics and Norwegian from St. Olaf College and a Ph.D. in biostatistics from the University of Washington. His methodological research focuses on analysis methods for longitudinal (or, correlated) and survival (or, event-time) data. At RERF, he developed novel analysis approaches for radiation risk estimation for cancer mortality and incidence, while accounting for potential sources of unmeasured confounding and outcome misclassification. As a collaborative biostatistician, he has led or participated in a wide range of biomedical research projects, most recently as director of the biostatistics core for an international consortium studying outcomes among cancer patients diagnosed with COVID-19. He has taught short courses on longitudinal data analysis and joint modeling of longitudinal and survival outcomes in the U.S. and abroad.

Bernard D. Goldstein

Member

Bernard D. Goldstein, M.D., University of Pittsburgh (ret.) is Emeritus Dean and Emeritus Professor of Environmental and Occupational Health at the University of Pittsburgh Graduate School of Public Health. He is an elected member of the National Academy of Medicine (NAM), and has chaired over a dozen NAM or National Research Council Committees. He has also chaired committees related to environmental health for the World Health Organization and the United Nations Environmental Program. His past experience includes service as Assistant Administrator for Research and Development of the U.S. Environmental Protection Agency, 1983-1985, and President of the Society for Risk Analysis. Dr Goldstein was the founding director of the Environmental and Occupational Health Sciences Institute (EOHSI) of Rutgers University. While at EOHSI he was the initial Principal Investigator of the Consortium for Risk Analysis with Stakeholder Participation (CRESP), a multi-university program responsive to DOE's research needs related to the cleanup of nuclear weapon sites, a position he held from 1995-2001. Since then he has continued occasional involvement in CRESP and in other nuclear-related activities, including participation in a congressionally-mandated committee to review risk-based approaches to cleanup of aspects of the Hanford site and authoring a recent op ed related to the risk of nuclear waste. He also has been significantly involved in other energy issues including the use of methyl tert-butyl ether as a gasoline additive; the risk of unconventional national gas drilling; and the health impact of the Deepwater Horizon oil spill. Dr. Goldstein holds a BS in psychology from University of Wisconsin, Madison (1958), and an MD from New York University School of Medicine (1962).

John D. Graham

Member

John D. Graham is Dean, Indiana University School of Public and Environmental Affairs (SPEA). Graham's research interests include government reform, energy and the environment, and the future of the automobile in both developed and developing countries. He came to SPEA after serving as Dean of the Frederick Pardee RAND Graduate School at the RAND Corporation in California. Prior to joining RAND, Dr. Graham served in the White House Office of Management and Budget (OMB) from 2001 -06. As the Senate-confirmed Administrator of the Office of Information and Regulatory Affairs, he led a staff of 50 career policy analysts who reviewed major regulatory proposals from Cabinet agencies. Prior to his role at OMB, Dr. Graham was a Professor of Policy and Decision Sciences at the Harvard School of Public Health. From 1990 to 2001, Dr. Graham founded and led the Harvard Center for Risk Analysis. In 1995, he was elected President of the Society for Risk Analysis, an international membership organization of 2,400 scientists and engineers. Dr. Graham holds a B.A. (with honors) in economics and politics from Wake Forest University (1978), an M.A. in public affairs from Duke University (1980), and a Ph.D. in urban and public affairs from Carnegie-Mellon University (1983).

Elizabeth M. Jaffee

Member

Dr. Elizabeth M. Jaffee is an internationally recognized expert in cancer immunology and pancreatic cancer. She is Deputy Director of the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Co-Director of the Skip Viragh Pancreatic Cancer Center and Associate Director of the Bloomberg Kimmel Institute for Cancer Immunotherapy. Her research focus is on developing novel immunotherapies for the treatment and prevention of pancreatic cancer. Dr. Jaffee is a Past President of AACR. She has served on a number of committees at the National Cancer Institute including co-chair of the Blue Ribbon Panel that provided scientific advice to Vice President Biden's Moonshot Initiative. She currently serves as chair of the National Cancer Advisory Board and Chief Medical Advisor to the Lustgarten Foundation for Pancreatic Cancer Research. She is the inaugural Director of the new Convergence Institute at Johns Hopkins. She was recently elected to the National Academy of Medicine and is a Fellow of the American College of Physicians. Dr. Jaffee graduated magna cum laude from Brandeis University (1981) before receiving her medical degree from New York Medical College.

Evagelia C. Laiakis

Member

Dr. Evagelia C. Laiakis received her Ph.D. degree in Human Genetics from the University of Maryland at Baltimore (2006), studying radiation induced genomic instability and the contribution of pro-inflammatory processes. She subsequently completed her postdoctoral fellowship at Georgetown University (2012), in the field of radiation biodosimetry through metabolomics. She is currently an Associate Professor in the Department of Oncology at the Lombardi Comprehensive Cancer Center with a secondary appointment in the Department of Biochemistry and Molecular and Cellular Biology. Dr. Laiakis is an elected Council Member to the National Council on Radiation Protection and Measurements (NCRP) and has been serving as a member of PAC-1 of NCRP (Basic Criteria, Epidemiology, Radiobiology, and Risk) since 2016. She served as a Program Committee Member for the 2021 Annual NCRP meeting and is a co-Chair for the 2022 Annual NCRP meeting. Dr. Laiakis' lab aims to expand the field of radiation metabolomics and lipidomics through mass spectrometry with untargeted and targeted approaches. Her research focus includes understanding metabolic responses to scenarios involving a wide range of doses (low dose to acute radiation syndrome associated doses), dose rates, normal tissue responses, and radiation quality effects (photons, neutrons, high energy particles), utilizing biofluids and tissues from rodents to humans. Her work has also expanded to space radiation effects, in combination with stressors such as microgravity, with emphasis on skeletal muscle metabolism related changes. Finally, she is an Associate Editor for the International Journal of Radiation Biology (IJRB) and the Radiation Research journal and the 2019 recipient of the Jack Fowler award from the Radiation Research Society.

Lindsay M. Morton

Member

Lindsay M. Morton, Ph.D., is currently a Senior Investigator and Deputy Chief of the Radiation Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute (NCI). She trained in Molecular Epidemiology as a Post-Doctoral Fellow at the NCI after earning a Ph.D. in Epidemiology with a focus on cancer from Yale University and an A.B. from Dartmouth College. Dr. Morton's research focuses on quantifying risks of subsequent malignancies among cancer survivors, particularly following treatment with radiotherapy and/or systemic therapies (chemotherapy, immunotherapy) and also incorporating research on germline genetic susceptibility. Much of her research is focused on high-risk populations such as childhood cancer survivors, individuals with inherited cancer predisposition syndromes, and stem cell transplant recipients. She also has a long-term interest in etiology and survivorship of hematologic malignancies and has led research on the somatic changes in tumors that arise following radiation exposure, particularly thyroid cancer following the Chernobyl nuclear power plant accident. Based on 200 peer-reviewed publications, findings from Dr. Morton's studies have contributed to assessments of the risks and benefits of cancer treatments, guidelines for long-term surveillance of cancer survivors, methodologic improvements in data collection for cancer survivors, and understanding of the biological basis of radiation carcinogenesis. She has served as co-chair of the Late Effects Task Force of the Center for International Blood and Marrow Transplant Research (CIBMTR); as an Associate Editor for the Journal of the National Cancer Institute; on the editorial boards of Cancer Research, British Journal of Cancer, and Leukemia and Lymphoma; and as a member of the Radiogenomics Consortium Steering Committee. Dr. Morton is an elected member of the American Epidemiological Society.

David B. Richardson

Member

David B. Richardson is Professor in the Department of Epidemiology, School of Public Health at the University of North Carolina at Chapel Hill. He is Deputy Director of the North Carolina Occupational Safety and Health Education and Research Center and director of the center's Program in Occupational Epidemiology. His research focuses on the health effects of occupational and environmental exposures, particularly with regards to carcinogens. He has conducted studies of cancer among workers in the United States and abroad. Dr. Richardson's current research includes studies of mortality among nuclear industry workers and uranium miners, and development of new methods for occupational cohort studies. He is a member of Committee 1 (Radiation Effects) of the International Commission on Radiological Protection, serves as a Lead Coordinating Writer for the United Nations Committee on Epidemiological Studies of Radiation and Cancer, Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and serves as Associate Editor of the journals Occupational and Environmental Medicine and American Journal of Epidemiology. His service on National Academies committees includes the Committee to Review the Health Effects in Vietnam Veterans of Exposure to Herbicides - Tenth Biennial Update and the Committee on the Review of the Department of Labor's Site Exposure Matrix (SEM) Database. Dr. Richardson received a PhD and MSPH, both in epidemiology, from the University of North Carolina at Chapel Hill.

Dorthe Schaue

Member

Dörthe Schaue, PhD, is an Associate Professor of Radiation Oncology at the University of California at Los Angeles. For two decades her work has focused on the effects of ionizing radiation on the immune system, on tumor immunity and on radiation mitigation. Originally trained at radiation research institutions in the UK and Germany, including the Gray Lab in London and the Paterson Institute in Manchester Dr. Schaue developed an interest in the immunological aspects of low dose radiation exposures and was able to build on this knowledge since joining UCLA in 2004. Her current NIH-funded research efforts focus on understanding the complex interaction at the irradiated immune-tumor-host interface, and the development of immunoPET for monitoring these interactions in vivo. Her interests in radiation-induced immune imbalances and the role of chronic inflammation, fibrosis and tissue remodeling in late effects of radiation damage, and life shortening grew through her involvement in extensive radiation mitigation studies. She has mentored numerous students, residents and postgraduate researchers and she is a member of the Physics and Biology in Medicine Graduate program at UCLA where she teaches Radiation Biology and Immunity in addition to basic and translational radiobiology to UCLA Radiation Oncology Residents. She is an associate editor for the International Journal of Radiation Biology and a reviewer for the NCI Clinical and Translational Exploratory/Developmental, and other, Study Sections. She currently serves on multiple national radiation interest committees, including NCRP's PAC1, ASTRO's Radiobiology Task Force, and RRS.

Rashid A. Shaikh

Member

Rashid A. Shaikh, Ph.D., is Director of Science Emeritus at the Health Effects Institute (HEI), a non-profit, independent research organization. He led scientific strategic planning for HEI, and he was responsible for the management and oversight of HEI's diverse research portfolio and review activities. Working closely with multi-disciplinary expert committees and paying close attention to policy and regulatory needs, he directed the planning and execution of HEI's research on particulate matter, exposure assessment, accountability, ozone, diesel emissions, and other air pollutants, many of HEI's studies have provided important information for regulatory policy. His responsibilities included the rigorous, independent peer review and preparation of commentary on all completed HEI-sponsored research. Additionally, he convened and managed several comprehensive and state-of-the-science reviews of research on air pollution and its health effects prepared by scientific panels. He also worked on science policy issues, including the use of human subjects, conflict of interest, data confidentiality and data access, and publication policy. Dr. Shaikh has served on several national scientific committees, including those at the Environmental Protection Agency and the California Air Resources Board, and he has served on the Board of Advisors at the Center for Environmental Research and Technology, University of California Irvine. He has a special interest in air quality and health issues, the use of new fuels and technologies for automobiles, and in air pollution, and strategic research planning the use of scientific information for policy making. Dr. Shaikh received his bachelor's degree from St. Xavier's College in Bombay, India, and his masters from the Indian Institute of Technology in Kanpur, India. He received his doctorate in biology from Massachusetts Institute of Technology, Cambridge.

Gayle E. Woloschak

Member

Gayle E. Woloschak, Ph.D., is currently a professor of Radiation Oncology at Northwestern University in Chicago and an adjunct professor of Religion and Science at Lutheran School of Theology Chicago, and at Pittsburgh Theological Seminary. She holds a Ph.D. in Biomedical Sciences from the University of Toledo (Medical College of Ohio), and a D.M. in Eastern Christian Studies from Pittsburgh Theological Seminary. Her laboratory interests include molecular biology, radiation biology and nano-biotechnology, and her science-religion fields include biological evolution, stem cell research, and ecology.

Ourania Kosti

Staff Officer

Ourania “Rania” Kosti, Ph.D., is a Senior Program Officer at the Nuclear and Radiation Studies Board (NRSB) of the National Academies of Sciences, Engineering, and Medicine. Dr. Kosti’s interests within the NRSB focus on radiation health effects, and she is the Principal Investigator for the National Academies’ Radiation Effects Research Foundation Program that supports studies of the atomic bombing survivors in Japan. Prior to her current appointment, she was a postdoctoral fellow at the Lombardi Comprehensive Cancer Center at Georgetown University Hospital in Washington, DC, where she conducted research on biomarker development for early cancer detection using case-control epidemiological study designs. She focused primarily on prostate, breast, and liver cancers and trying to identify those individuals who are at high risk of developing malignancies. Dr. Kosti also trained at the National Cancer Institute (2005–2007). She received a B.S. in biochemistry from the University of Surrey, United Kingdom, an M.S. in molecular medicine from the University College London, and a Ph.D. in molecular endocrinology from St. Bartholomew’s Hospital in London, United Kingdom.