

Assessing Radiation Exposure, Health Outcomes, and Mitigation Strategies for Flight Crewmembers

Committee

Jonathan M. Samet

Chair

Jonathan M. Samet (chair), a pulmonary physician and epidemiologist, is the past dean of the Colorado School of Public Health and Professor of Epidemiology and of Occupational and Environmental Health. Samet's research has focused on the health risks posed by the environment, including inhaled pollutants and tobacco. He has served on numerous committees concerned with public health and the environment including the U.S. Environmental Protection Agency Science Advisory Board and the National Cancer Advisory Board. He is a member of the National Academy of Medicine and recipient of the David Rall Medal for his contributions. Samet received an A.B. in chemistry and physics from Harvard College, an M.S. in epidemiology from the Harvard T.H. Chan School of Public Health, and an M.D. from the University of Rochester School of Medicine and Dentistry. He previously served as chair of the National Academies Committees on Biological Effects of Ionizing Radiation VI Committee and the Committee on Incorporating 21st Century Science in Risk-Based Evaluations and served as a member of the Board on Environmental Studies and Toxicology.

Amir A. Bahadori

Member

Amir A. Bahadori is Professor in the Alan Levin Department of Mechanical and Nuclear Engineering, serves as Nuclear Engineering Program Director, and holds the Hal and Mary Siegele Professorship in Engineering at Kansas State University. He previously worked in the Space Radiation Analysis Group at NASA's Lyndon B. Johnson Space Center. Bahadori has an extensive background in space radiation sources and transport, radiation dosimetry, radiation detection, radiation risk models, and radiation epidemiology. He is presently collaborating on the Million Person Study of Radiation Workers and Atomic Veterans. He is a member of the American Nuclear Society, the Health Physics Society, and the Radiation Research Society. He serves on the National Council on Radiation Protection and Measurement (NCRP) Council and the Program Area Committee 6: Radiation Measurements and Dosimetry. In 2018, he was awarded the Zeldovich Medal for his work on space radiation detection, and in 2022, he was awarded the American Nuclear Society Presidential Citation for his work on the Society's position statement on low-level radiation exposure health effects. Bahadori received a B.S. in mechanical engineering with nuclear engineering option and a B.S. in mathematics from Kansas State University, an M.S. in nuclear engineering sciences from the University of Florida, and a Ph.D. in biomedical engineering from the University of Florida.

Bahadori previously received research funding from Radiation Detection Technologies, Inc., a company that specializes in semiconductor-based radiation detection. He is also a listed inventor on a patent related to measurement of the in-flight neutron spectrum for radiation protection purposes.

Thomas A. Burke

Member

Thomas A. Burke is Professor Emeritus at Johns Hopkins University Bloomberg School of Public Health and Director Emeritus of the Johns Hopkins Risk Sciences and Public Policy Institute. His research interests include environmental epidemiology and surveillance, population exposures to environmental pollutants, risk assessment and communication, and application of the risk sciences to public policy. Before joining the University faculty, he was Deputy Commissioner of Health for the State of New Jersey and Director of Science and Research for the New Jersey Department of Environmental Protection. From 2015 until 2017 Burke was the Environmental Protection Agency Science Advisor and Deputy Assistant Administrator for Research and Development. He is a Fellow of the Society for Risk Analysis, an Honorary Member of the Society of Toxicology, and a lifetime National Associate of the National Academies. Burke received a B.S. from St. Peter's University, an M.P.H. from the University of Texas, and a Ph.D. in epidemiology from the University of Pennsylvania. He previously served on the National Academies Division on Earth and Life Studies Committee, the Board on Environmental Studies and Toxicology, and chaired the Committee on Improving Risk Analysis, and the Committee on Human Biomonitoring for Environmental Chemicals.

Casey Canfield

Member

Casey I. Canfield is an Associate Professor in Engineering Management and Systems Engineering at the Missouri University of Science and Technology. She quantifies the human part of complex systems to improve decision-making and policymaking in the context of energy, rural broadband, and healthcare. She leads multi-sector, cross-disciplinary, stakeholder-centered teams for problem-oriented research. Across domains, she conducts participatory research, collaborating with people who are ultimately impacted by technology. Canfield serves on the advisory board of the Missouri Science and Technology (MOST) Policy Fellowship and the Missouri Energy Initiative. She was a Science and Technology Policy Fellow in the U.S. Department of Energy's Solar Energy Technologies Office where she was primarily involved in designing and managing programs that aim to increase innovation and reduce soft costs in the energy sector. Canfield received a B.S. in engineering: systems from Olin College of Engineering and a Ph.D. in engineering and public policy from Carnegie Mellon University.

Sarah S. Cohen

Member

Sarah S. Cohen, is Director, Public Health Research at DLH, LLC, a federal contractor. She is also an Adjunct Assistant Research Professor of Medicine within the Department of Medicine at the Vanderbilt University School of Medicine. Previously, she spent 20 years in the commercial consulting space at EpidStat Institute, EpidStrategies, and the International Epidemiology Institute leading the design, conduct, and analysis of epidemiologic studies related to pharmacoepidemiology, nutrition, and health outcomes including cancer, cardiovascular disease, and diabetes as well as occupational cohort studies of aerospace workers, welders, and chemical manufacturers. Her expertise includes occupational exposures and health outcomes as well as behavioral and genetic determinants of cancer and metabolic-related conditions such as obesity, racial disparities in cancer, biomarkers of cancer and obesity, and cancer screening. She is a technical consultant to the National Council on Radiation Protection and Measurements with whom she has collaborated on multiple cohort studies examining health effects among radiation-exposed workers. Cohen received an M.S. in biostatistics and public health genetics from the University of Michigan and a Ph.D. in epidemiology from the University of North Carolina, Chapel Hill.

Mardi Crane-Godreau

Member

Mardi Crane-Godreau, former Assistant Professor at Geisel School of Medicine at Dartmouth (DMS), now devotes her attention to writing on Long COVID and aging at Substack. As an Associate Editor at Frontiers in Human Neuroscience and Frontiers in Public Health, she is currently working on Volume II of Aerospace Health and Safety, Now and the Future. Her research at DMS included a multi-phase clinical trial studying the health of secondhand smoke-exposed airline flight attendants. This was focal to her interest after spending 18 years as a Pan Am Flight Attendant. She is a member of Mitochondrial Medical Society, World Wings Internation and the Pan Am Museum Foundation, as well as a member of the National Association of Science Writers. Crane-Godreau's educational background includes a PhD in physiology from the Geisel School of Medicine at Dartmouth, a BA in biology and chemistry from Massachusetts College of Liberal Arts (MCLA) and a BS in Education from the University of Vermont. Crane-Godreau was awarded an honorary Doctor of Science Degree by MCLA in 2013. She also holds a non-degree credential in Trauma Therapy from the Somatic Experiencing Trauma Institute.

Lindsay S. Fenwick

Member

Lindsay S. Fenwick is an accomplished aviation professional with over 21,000 flight hours spanning military, corporate, VIP, and major airline operations. His distinguished career began with the Royal New Zealand Air Force before transitioning to commercial aviation, where he served as a pilot for Northwest Airlines for nearly 25 years and held captain positions with multiple international carriers including Bahrain Air and National Air Services. Fenwick has extensive expertise in aviation safety management, serving as Deputy Manager Safety at Qatar Amiri Flight and holding leadership roles with the International Federation of Air Line Pilots' Associations (IFALPA) and Air Line Pilots Association (ALPA). He is a highly experienced accident investigator, having been directly involved with three major NTSB investigations and serving as Course Director/Instructor for ALPA's accident investigation programs for over a decade. Currently, he operates as Director of Contrails Consulting Ltd, specializing in aviation risk and property management, while continuing his safety advocacy work with international aviation organizations. His comprehensive qualifications include certifications in Safety Management Systems (SMS), Fatigue Risk Management Systems (FRMS), aviation auditing, and emergency response management. Mr. Fenwick is graduate of the US Air Force Academy with a BS in Physics and earned advanced degrees including an MS in Aeronautical/Astronautical Engineering from Stanford University and an MBA from the University of Minnesota, respectively.

Heidi Hanson

Member

Heidi A. Hanson is the group lead of Biostatistics and Biomedical Informatics in the Computational Sciences and Engineering Division at Oak Ridge National Laboratory. She holds adjunct appointments in the Department of Population Health Sciences and Surgery at the University of Utah. She is also a graduate advisor at the University of Tennessee Bredesen Center for Interdisciplinary Research and Graduate Education. Hanson is also the Principal Investigator of the DOE-National Cancer Institute's Modeling Outcomes using Surveillance Data and Scalable Artificial Intelligence (MOSSAIC), focused on advancing computing, predictive machine learning/deep learning (ML/DL) models, and large-scale computational simulations for NCI-supported cancer research. In 2022, her team was awarded the National Cancer Institute's Director's Award for Data Science in the Cancer Surveillance Data Collaborators Group in recognition of the scientific collaboration leading to new deep learning models that help the United States achieve near real-time reporting of cancer incidence. Hanson is also the Principal Investigator of the bio preparedness project EHRLICH. She is also involved in multiple projects investigating the effect of environmental exposures, such as radon gas and air pollution, on health outcomes. Her training and experience in the fields of machine learning, AI, demography, statistics, environmental epidemiology, and life course epidemiology allow her to bring a unique set of expertise to this study. Hanson has a graduate certificate in Demography as well as a BS in Behavioral Health Sciences and both an MS and PhD in Sociology with an emphasis in demography and life course epidemiology from the University of Utah, respectively.

Benjamin W. McGee

Member

Benjamin W. McGee is the Assistant Director for Radiation Safety and Radiation Safety Officer for the University of Maryland, College Park. He brings nearly 20 years of experience in health physics and radiological safety across government, commercial spaceflight, and academic sectors. Previously, McGee served as a senior scientist with the Department of Energy's National Nuclear Security Administration (NNSA) Aerial Measuring System (AMS) program and as lead health physicist and radiological engineer for astronaut safety and dosimetry at both Bigelow Aerospace, which currently has a module deployed to Node 3 of the International Space Station (ISS), and Axiom Space, which has conducted four private astronaut missions to the ISS. He also spent nearly a decade as a health physicist at the Nevada National Security Site, where he was lead analyst for nuclear accident dosimetry and served as a Monitoring Manager for the Federal Radiological Monitoring and Assessment Center's (FRMAC's) Consequence Management Response Team (CMRT). McGee's research background includes aviation-focused radiation dosimetry, having served as Proposer and Principal Investigator for a Department of Energy-funded study assessing cosmic radiation dose contributions aboard both fixed-wing and rotary-wing aircraft. He is a member of the Health Physics Society, the National Register of Radiation Protection Technologists, the American Institute of Aeronautics and Astronautics, and is a National Fellow of the Explorers Club. He holds a B.S in Geology from the University of Wyoming, where he specialized in infrared spectroscopy of planetary surfaces, and a M.S. in Space Studies from the University of North Dakota, where his research focused on the effects of space radiation on asteroid surfaces (space weathering).

Christopher J. Mertens

Member

Christopher J. Mertens is a senior research physicist at NASA Langley Research Center, where he has been employed for 25 years. Mertens' areas of expertise include atmospheric and space ionizing radiation transport and dosimetry, and space environment modeling. He is the architect and primary developer of the Nowcast of Aerospace Ionizing RAdiation System (NAIRAS) model and was the Principal Investigator (PI) of the NASA Radiation Dosimetry Experiment (RaD-X) and the NASA Space Weather Aviation Radiation (SWXRAD) flight campaigns. Mertens is the 2024 recipient of the NASA Exceptional Technology Achievement Medal, the 2022 recipient of the NASA Langley H. J. E. Reid Award for best scientific paper published in a peer-reviewed journal. He is the recipient of the Small Business Technology Council's 2016 Champion of Small Business Commercialization Award, the 2012 and 2022 NASA Exceptional Scientific Achievement Medals, and many more professional awards. He has been the PI of numerous research and analysis projects over the last 2 decades and has authored over 100 peer-reviewed scientific journal articles. Mertens has co-authored papers on computational modeling of cosmic ionizing radiation exposure and space weather in peer-reviewed journals with FAA experts. Mertens earned a PhD in physics from the Georgia Institute of Technology.

Christopher Scheibler

Member

Christopher Scheibler is a Chief Flight Surgeon in the United States Air Force and is board-certified in aerospace medicine and occupational and environmental medicine. He has served in clinical, executive, and command positions directing aerospace, occupational, and preventive medicine programs overseeing health and safety for active-duty military and civilian populations. Additionally, he is a staff collaborator for the Harvard Flight Attendant Health Study. Scheibler's research focuses on potential health impacts from flight-related occupational exposures in the aerospace environment including radiation, circadian rhythm disruption, chemical and biological agents, noise and vibration, cardiopulmonary function changes, and flight-related mental stressors. He currently serves as an editor for Frontiers in Public Health reviewing manuscripts covering topics dealing with aerospace health and safety. Also, he previously worked as an Advisory Member with the Commercial Spaceflight Federation on the Committee to Create a Human Research Program for Spaceflight Participants in the Commercialization of Space. Scheibler received a B.S. in mathematics from Baylor University, an M.D. from the Uniformed Services University of the Health Sciences, and an M.P.H. from the Harvard T.H. Chan School of Public Health.