

Dual Use Research of Concern: Options for Future Management

Committee

Richard A. Meserve

Co-Chair

RICHARD A. MESERVE (NAE), J.D., Harvard Law School; Ph.D. (Applied Physics) Stanford University; B.A., Tufts University, is President Emeritus of the Carnegie Institution for Science. Before assuming the Carnegie presidency in April 2003, he was Chairman of the U.S. Nuclear Regulatory Commission (NRC), having served since October 1999. Before joining the NRC, Dr. Meserve was a partner in the law firm of Covington & Burling LLP, where he now serves on a part-time basis as a Senior Of Counsel. He devoted his legal practice to technical issues arising in environmental and toxic tort litigation, counseling scientific societies and high-tech companies, and nuclear licensing. Early in his career, he served as legal counsel to the President's science advisor, and was a law clerk to Justice Harry A. Blackmun of the United States Supreme Court and to Judge Benjamin Kaplan of the Massachusetts Supreme Judicial Court. He is a member of the National Academy of Engineering and the American Philosophical Society; a Fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Sciences, and the American Physical Society; and a Foreign Member of the Russian Academy of Sciences. He currently serves as Chairman of the International Nuclear Safety Group, chartered by the International Atomic Energy Agency, and Co-Chairman of the Department of Energy's Nuclear Energy Advisory Committee. He is also President of the Board of Overseers of Harvard University and a member of the Council of the National Academy of Engineering. He has previously served on numerous committees and boards of the National Academies. Dr. Meserve also serves on the boards of PG&E Corporation and TriAlpha Energy Corporation. He wrote the amicus briefs on behalf of the National Academy of Engineering in the Kumho case and on behalf of the National Academy of Sciences in the Daubert case. These landmark cases established the basis for admitting expert testimony into court.

Harold E. Varmus

Co-Chair

HAROLD E. VARMUS (NAS/NAM), M.D., co-recipient of a Nobel Prize in 1989 for studies of the genetic basis of cancer, joined the Meyer Cancer Center of Weill Cornell Medical College as the Lewis Thomas University Professor on April 1, 2015, when he also became a Senior Associate Member of the New York Genome Center. Previously, Dr. Varmus was the Director of the National Cancer Institute (2010-2015), President of Memorial Sloan-Kettering Cancer Center (2000-2010), and Director of the National Institutes of Health (1993-1999). A graduate of Amherst College and Harvard University in English literature and of Columbia University in Medicine, he trained at Columbia University Medical Center, the National Institutes of Health, and the University of California San Francisco (UCSF), before joining the basic science faculty at UCSF, where he worked for over two decades (1971-1993). The author of over 350 scientific papers and five books, including a memoir entitled *The Art and Politics of Science* (2009), he was a co-chair of President Obama's Council of Advisors on Science and Technology, a co-founder and Chairman of the Board of the Public Library of Science, and chair of the Scientific Board of the Gates Foundation Grand Challenges in Global Health. He is a foreign member of the Royal Society and is involved in several initiatives to promote science and health in developing countries.

Arturo Casadevall

Member

ARTURO CASADEVALL (NAM) is Professor and Chair in the W. Harry Feinstone Department of Molecular Microbiology and Immunology at the Johns Hopkins University School of Public Health. Formerly, he was Leo and Julia Forchheimer Professor of Microbiology and Immunology; Chair, Department of Microbiology and Immunology; and Professor, Department of Medicine at the Albert Einstein College of Medicine. The laboratory has a multidisciplinary research program spanning several areas of basic immunology and microbiology to address these general questions, which has resulted over 460 publications. He is a fellow of the American Academy of Microbiology and was elected to the American Society for Clinical Investigation, to the American Association of Physicians and as a fellow of the AAAS. Dr. Casadevall has served on numerous advisory committees to the NIH including study sections, strategic planning for the NIAID and the blue ribbon panel on response to bioterrorism. He currently co-chairs the Board of Scientific Counselors for the NIAID and is a former member of the National Science Advisory Board for Biosecurity (NSABB). He is the founding editor of the first ASM general journal, *mBio* and serves on the editorial boards of several journals, and has been the recipient of numerous awards, most recently the Solomon A. Berson Medical Alumni Achievement Award in Basic Science-NYU School of Medicine 2005, IDSA Kass Lecturer in 2008 and the ASM William Hinton Award for mentoring scientists from underrepresented groups.

Dr. Casadevall received his B.A. from Queens College, CUNY, and M.S., M.D. and Ph.D. degrees from New York University.

Denise Chrysler

Member

DENISE CHRYSLER serves as director for the Mid-States Region of the Network for Public Health Law. Previously, she served as the public health legal director for the Michigan Department of Community Health (MDCH). In this position, she coordinated the legal needs of the Public Health Administration and provided legal expertise and assistance regarding public health powers, programs and services.

For 27 years, Ms. Chrysler provided legal services to the Michigan Department of Community Health regarding public health powers, programs, and services, serving as the public health legal director, the director of the Office of Legal Affairs, the department's chief privacy officer, the regulatory affairs officer, the Freedom of Information Act coordinator, a member of the department's Institutional Review Board, and as an assistant attorney general. As a state attorney, Ms. Chrysler served on the department's Steering Committee and Privacy and Security subcommittee to develop health information exchange, and was the lead author of the legal sections of Michigan's e-Health Initiative Conduit to Care Report. She worked extensively on the Michigan BioTrust Project to make newborn screening blood specimens and associated data available for health research. Finally, she served on the statewide Bed Bug Working Group and was lead author of the legal sections of the Michigan Manual for the Prevention and Control of Bed Bugs.

She is a member of the Public Health Law Association and the State Bar Health Care Law Section. She is admitted to practice before both state and federal courts in Michigan. She is also the recipient of the Frank J. Kelley Award for Excellence for successful efforts to protect mammograms and medical records of some 200,000 patients in Southeast Michigan who were abandoned by a bankrupt health provider.

Ms. Chrysler graduated from the University of Michigan Law School.

Anuj Desai

Member

ANUJ DESAI Anuj C. Desai is the William Voss-Bascom Professor of Law at the University of Wisconsin, where he teaches in both the Law School and the School of Library and Information Studies, offering classes in Copyright, First Amendment, Legislation, Legislation and Regulation, and Cyberlaw. He is currently on leave, serving as an administrative appellate judge, as a member of the Administrative Review Board of the United States Department of Labor. He also serves as a part-time Commissioner of the Foreign Claims Settlement Commission, an independent, quasi-judicial agency of the United States Department of Justice that adjudicates claims of U.S. nationals against foreign governments.

Professor Desai writes in a variety of different areas, with a focus on understanding how social, historical, and institutional contexts shape law. His publications have appeared in the Stanford Law Review, Northwestern University Law Review, Hastings Law Journal, Federal Communications Law Journal, and University of Pennsylvania Journal of Constitutional Law. His papers are available for download on the Social Science Research Network. Professor Desai has served as a visiting professor at the Johns Hopkins University-Nanjing University Center for Chinese and American Studies in Nanjing, China; National Tsing Hua University Institute of Law for Science and Technology in Hsinchu, Taiwan; and National Taiwan University College of Law in Taipei, Taiwan.

Prior to entering academia, Professor Desai practiced law with the Seattle, Washington firm of Davis Wright Tremaine, where his practice focused primarily on First Amendment, defamation, newsgathering, copyright and trademark litigation. Before his time in private practice, he served as a legal assistant to the American judges at the Iran-United States Claims Tribunal in The Hague and clerked for the late Judge Louis F. Oberdorfer at the U.S. District Court for the District of Columbia and Judge David S. Tatel at the U.S. Court of Appeals for the D.C. Circuit. He also worked briefly in the Legal Adviser's Office at the U.S. State Department and also at the Legal Resources Centre in Grahamstown, South Africa.

Professor Desai received his A.B. in Mathematics from Harvard University (where he was awarded a Henry Russell Shaw Fellowship), a Master's in International Affairs from Columbia University and a J.D. from the University of California-Berkeley (Boalt Hall), where he was Editor-in-Chief of the California Law Review.

Michael Ettenberg

Member

MICHAEL ETTENBERG (NAE) is Managing Partner at DOLCE Technologies, a company which commercializes technologies invented at leading universities, such as Princeton and Columbia. Previously, he retired from Sarnoff (formerly RCA) Labs after 35 years, ending as Senior Vice President in charge of all of Sarnoff's device research, including small silicon integrated circuit fabrication, TV displays, optoelectronics, and cameras. Dr. Ettenberg has extensive experience with III-V materials and optoelectronic devices. He developed the dielectric mirrors used on all of today's laser diodes. Dr. Ettenberg has published 110 papers and has been awarded 35 patents, mainly in the area of optoelectronics. He also was president of the IEEE Lasers and Electro-Optics Society and a member of the Defense Science Board.

Dr. Ettenberg received his B.S. from the Polytechnic Institute of Brooklyn and his M.S. and Ph.D. from New York University in material science.

David P. Fidler

Member

DAVID FIDLER is the James Louis Calamaras Professor of Law at the Indiana University Maurer School of Law and is one of the world's leading experts on international law and global health. His books in this area include *Biosecurity in the Global Age: Biological Weapons, Public Health, and the Rule of Law* (Stanford University Press, 2008) (with Lawrence O. Gostin), *SARS, Governance, and the Globalization of Disease* (Palgrave Macmillan, 2004), *International Law and Public Health: Materials on and Analysis of Global Health Jurisprudence* (Transnational Publishers, 2000), and *International Law and Infectious Diseases* (Clarendon Press, 1999). He has published over 100 articles and chapters on global health topics in legal, public health, medical, and political science journals and books.

In addition to his teaching and scholarly activities, Professor Fidler has served as an international legal consultant to the World Health Organization and the U.S. Centers for Disease Control and Prevention. He has twice been appointed by the Director-General of the World Health Organization as a member of the IHR Roster of Experts, the members of which advise the Director-General on matters relating to the International Health Regulations (2005). He is an Associate Fellow with the Centre on Global Health Security at the Royal Institute of International Affairs (Chatham House).

Professor Fidler also specializes in other topics, including international law relating to cybersecurity and cyberspace. He is a Senior Fellow at the Indiana University Center for Applied Cybersecurity Research, and, in 2015, is a Visiting Fellow for Cybersecurity at the Council on Foreign Relations. He is the editor of the forthcoming book, *The Snowden Reader* (Indiana University Press, 2015).

He holds a BCL from the University of Oxford, a JD from Harvard Law School, an MPhil in International Relations from the University of Oxford, and a BA from the University of Kansas.

Claire M. Fraser

Member

CLAIRE FRASER (NAM) is Director of the Institute for Genome Sciences and a Professor of Medicine at the University of Maryland School of Medicine in Baltimore, Maryland. She was previously the President and Director of The Institute for Genomic Research in Rockville, Maryland. Dr. Fraser has played a seminal role in the sequencing and analysis of human, animal, plant and microbial genomes to better understand the role that genes play in development, evolution, physiology and disease. Her current research interests are focused on the structure and function of the human gut microbiota. Dr. Fraser has more than 240 scientific publications, and has served on committees of the National Science Foundation, Department of Energy and National Institutes of Health. She is the recipient of numerous awards and honors including the Promega Biotechnology Award and the E.O. Lawrence Award from the Department of Energy, she is a Fellow of AAAS and the American Association of Microbiology, and she has been elected into the Maryland Women's Hall of Fame and the Institute of Medicine.

Dr. Fraser received her Ph.D. in pharmacology from State University of New York at Buffalo.

Michael J. Hopmeier

Member

MICHAEL HOPMEIER is the President, Unconventional Concepts, Inc. and has been a technical advisor and operational consultant to numerous governmental agencies including the DARPA Defense Sciences Office, U.S. Army Medical Research and Materiel Command, United States Surgeon General, and the Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense. He was one of the primary developers of the Bioterrorism Preparedness Program at the CDC, served as the Science and Technology Advisor to the USAF Surgeon General, as well as the first S&T Advisor to the United States Marine Corps Chem/Bio Incident Response Force (CBIRF).

He has been a member and/or task force Chair for numerous senior advisory panels including the Defense Science Board and the National Academy of Sciences and served on the Senior Policy and Strategy Panel for Lawrence Livermore National Laboratory. He is a founding member and current member of the Executive Board of the International Counter-Terrorism Academic Community and an Associate Researcher of the Institute for Counter-Terrorism. Mr. Hopmeier is an internationally recognized expert on countering suicide terrorism, disaster/crisis response and emergency management and preparedness.

Mr. Hopmeier is a founder of a number of different start-up companies, and sits on the board of several high technology firms. He has been involved in numerous international programs as a manager or advisor, and has supported a number of efforts in the UK, Greece and Israel. He has authored numerous papers and presentations on topics ranging from biological model development and biotechnology research to emergency response training and suicide bombing.

His project areas include training and preparedness, chemical/biological incident response, combat casualty care and medical support, crisis response and management, unconventional pathogen countermeasure programs, federal agency protective measures, counter-terrorism and integrated federal/civilian disaster response.

Mr. Hopmeier holds a B.A. and an M.A. in mechanical engineering from the University of Florida.

James W. LeDuc

Member

JAMES LE DUC is Professor in the School of Medicine and Director of the Galveston National Laboratory at the University of Texas Medical Branch in Galveston, Texas. The Galveston National Laboratory is a biocontainment facility involved in basic and applied research into highly pathogenic infectious diseases, including Ebola virus. Work underway includes investigations into the development of vaccines, therapeutics and diagnostics for emerging infectious diseases and agents of potential use in bioterrorism. Prior to joining UTMB, Dr. Le Duc worked at the US Centers for Disease Control and Prevention where he served in various leadership roles, including director of the division of viral and rickettsial diseases, associate director for global health, and coordinator for pandemic influenza preparedness. Dr. Le Duc is an expert in public health, specifically in infectious diseases caused by viruses. Dr. Le Duc is a Fellow of the Infectious Diseases Society of America, and a member of several other professional societies. Dr. Le Duc was a medical officer in communicable diseases at the World Health Organization from 1992-1996, was instrumental in implementing the WHO program in emerging infectious diseases, and currently serves as a member of the Global Outbreak Alert and Response Network steering committee.

Dr. Le Duc received his B.S. in zoology from California State University, Long Beach and his M.S.P.H in infectious and trop diseases and Ph.D. in epidemiology from Univerisity of California, Los Angeles.

W. I. Lipkin

Member

W. IAN LIPKIN is John Snow Professor of Epidemiology, Professor of Neurology and Pathology, and Director of the Center for Infection and Immunity at the Columbia University, Mailman School of Public Health. He is internationally recognized as an authority on the use of molecular methods for pathogen discovery and the role of infection in neurologic and neuropsychiatric diseases. Dr. Lipkin has over 30 years of experience in diagnostics, microbial discovery and outbreak response.

In the 1980s, Dr. Lipkin identified AIDS-associated immunological abnormalities and inflammatory neuropathy, which he showed could be treated with plasmapheresis, and demonstrated that early life exposure to viral infections affects neurotransmitter function. Dr. Lipkin was the first to use purely molecular methods to identify infectious agents. In 1999, he identified West Nile virus as the cause of encephalitis in North America. He developed MassTag PCR and Greenechip technology, two multiplex assays that have been used to identify and characterize more than 400 viruses, and was the first to use high throughput sequencing for pathogen discovery. In 2003, Dr. Lipkin established the Norwegian Autism Birth Cohort (ABC), the largest prospective birth cohort devoted to investigating gene-environment-timing interactions and biomarker discovery. Currently, Dr. Lipkin is leading a study in collaboration with the National Institutes of Health and six other sites across the country to test the association between XMRV and Chronic Fatigue Syndrome.

Dr. Lipkin serves as co-chair of the Steering Committee of the National Biosurveillance Advisory Subcommittee and as Director of the Northeast Biodefense Center and the World Health Organization (WHO) Collaborating Center on Diagnostics, Surveillance and Immunotherapeutics for Emerging Infectious and Zoonotic Diseases, the only academic WHO Center focused on diagnostics and discovery. He has ongoing collaborations and projects with the Centers for Disease Control, National Institutes of Health, USAID PREDICT, US Department of Agriculture, US Food and Drug Administration, Agilent Technologies, Pfizer, Roche 454 Life Sciences, the Bill and Melinda Gates Foundation, Google.org, Institut Pasteur, and OneHealth Alliance.

Dr. Lipkin received his B.A. from Sarah Lawrence College and M.D. from Rush University.

Stephen S. Morse

Member

STEPHEN MORSE is Professor of Epidemiology and Director, Infectious Disease Epidemiology Certificate Program, Columbia University Medical Center. Dr. Morse's interests focus on epidemiology and risk assessment of infectious diseases (particularly emerging infections, including influenza), and improving disease early warning systems.

In 2000, he returned to Columbia after 4 years in government as program manager for Biodefense at the Defense Advanced Research Projects Agency (DARPA), Department of Defense, where he co-directed the Pathogen Countermeasures program and subsequently directed the Advanced Diagnostics program. Before coming to Columbia, he was assistant professor of Virology at The Rockefeller University in New York, and remains an adjunct faculty member. His book, *Emerging Viruses* (Oxford University Press) was selected by "American Scientist" for its list of "100 Top Science Books of the 20th Century". Dr. Morse was chair and principal organizer of the 1989 NIAID/NIH (National Institutes of Health) Conference on Emerging Viruses, for which he originated the term and concept of emerging viruses/infections; served as a member of the Institute of Medicine/National Academy of Sciences' Committee on Emerging Microbial Threats to Health (and chaired its Task Force on Viruses), and was a contributor to its report, *Emerging Infections* (1992). He subsequently served on the Steering Committee of the Institute of Medicine's Forum on Microbial Threats, and the National Academy of Sciences' committees on biowarfare threats; and as an adviser to numerous government and international organizations. He was the founding chair of ProMED (the nonprofit international Program to Monitor Emerging Diseases) and was an originator of ProMED-mail, an international network inaugurated by ProMED in 1994 for outbreak reporting and disease monitoring using the Internet.

Dr. Morse received his B.S. from City College New York and his M.S. and Ph.D. from University of Wisconsin.

Anne-Marie C. Mazza

Staff Officer