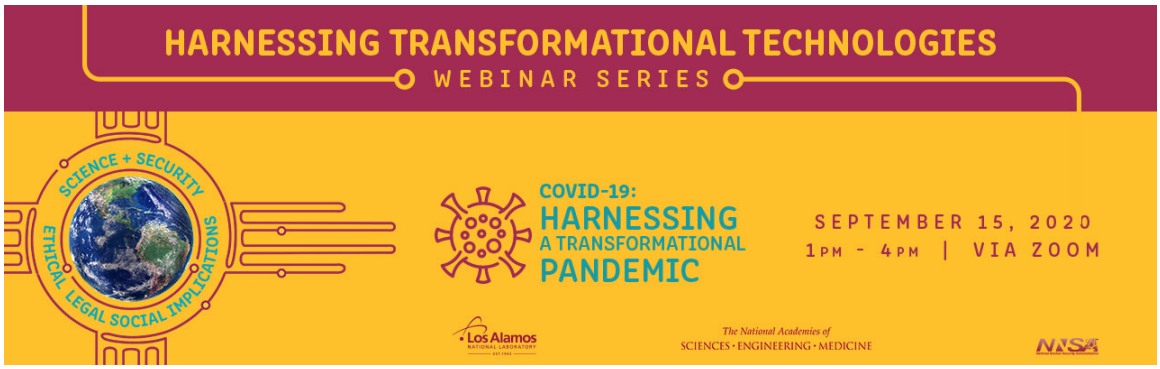


AGENDA
COVID-19: Harnessing a Transformational Pandemic

Webinar via Zoom: Tuesday, September 15, 2020

(NOTE: These are Eastern Standard Times!)

1:00 – 1:15 Welcome and Introduction to the Webinar Series
- **Thom Mason**, Director of Los Alamos National Laboratory

Perspective and Introduction to the Speakers: National Academy of Sciences Committee on Science, Technology & Law (NAS-CSTL):
- **Judge David S. Tatel**, NAS-CSTL

1:15 – 1:45 What Happens When a Virus Jumps Species
- **David Baltimore**, California Institute of Technology

1:45 – 2:15 COVID-19: Its Mutations and Vaccine
- **Bette Korber**, Los Alamos National Laboratory

2:15 – 2:30 Discussion: Moderated by **Mike Imperiale**, University of Michigan

2:30 – 2:45 Break

2:45 – 3:15 Lessons from COVID-19: Bio Preparedness and Security for the Next Inevitable Outbreak
- **Tom Inglesby**, Johns Hopkins

3:15 – 3:45 Post-Pandemic Bioethics
- **Alta Charo**, University of Wisconsin

3:45 – 4:00 Discussion: Moderated by **Anne-Marie Mazza**, NAS-CSTL

4:00 Conclusion

SPEAKERS BIOGRAPHIES

Opening Remarks

Thom Mason

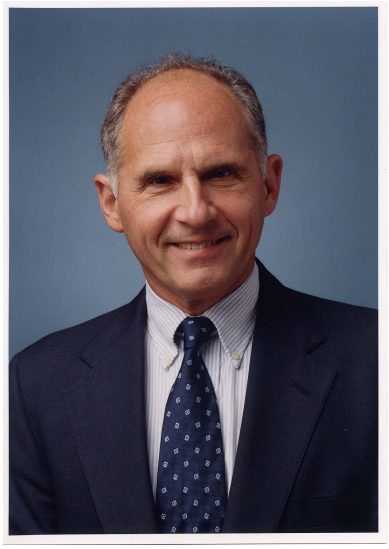
Thom Mason is the president and CEO of Triad National Security, LLC (Triad) and serves as the director of Los Alamos National Laboratory. Most recently he was the Senior Vice President for Global Laboratory Operations at Battelle, where he had responsibility for governance and strategy across the six national laboratories that Battelle manages or co-manages. Prior to joining Battelle, Mason worked at Oak Ridge National Laboratory (ORNL) for 19 years, including 10 years as the Laboratory director. Under his leadership, ORNL saw significant growth in programs, new facilities and hiring while achieving record low safety-incident rates.

Before becoming Laboratory director, he was associate laboratory director (ALD) for Neutron Sciences, ALD for the Spallation Neutron Source (SNS) and director of the Experimental Facilities Division. During his time in Oak Ridge, Mason was active in the community serving as chair of the Oak Ridge Public Schools Education Foundation as well as chair of Innovation Valley, the Knoxville-Oak Ridge area regional economic development organization.

He moved to ORNL from the University of Toronto where he was a faculty member in the Department of Physics and previously worked as a senior scientist at Risø National Laboratory in Denmark and a postdoctoral researcher at AT&T Bell Laboratories.

For the past 30 years, Mason has been involved in the design and construction of scientific instrumentation and facilities and the application of nuclear, computing and materials sciences to solve important challenges in energy and national security.

Mason has a Ph.D. in Experimental Condensed Matter Physics from McMaster University and a BSc in Physics from Dalhousie University.



David Tatel

Judge David S. Tatel was appointed to the United States Court of Appeals for the District of Columbia Circuit in October 1994. He earned his undergraduate degree from the University of Michigan and his J.D. from the University of Chicago. Among other things, he has served as director of the National Lawyers' Committee for Civil Rights Under Law and director of the Office for Civil Rights of the U.S. Department of Health, Education and Welfare during the Carter Administration. Returning to private practice in 1979, he joined Hogan & Hartson, where he founded and headed the firm's education practice until his appointment by President Clinton to the D.C. Circuit.

Tatel currently co-chairs the National Academy of Sciences' Committee on Science, Technology and Law and serves on the board of Associated Universities, Inc. He is a member of the American Philosophical Society and the American Academy of Arts and Sciences.

Session 1: What Happens When a Virus Jumps Species

David Baltimore

After serving as president of the California Institute of Technology for nine years, David Baltimore was appointed President Emeritus and the Robert Andrews Millikan Professor of Biology in 2006. Awarded the Nobel Prize at the age of 37 for research in virology, Baltimore has profoundly influenced national science policy on such issues as recombinant DNA research and the AIDS epidemic. He is an accomplished researcher, educator, administrator and public advocate for science and engineering, and is considered one of the world's most influential biologists.

Born in New York City, Baltimore became interested in biology during high school when he spent a summer at the Jackson Memorial Laboratory and worked with research biologists on mammalian genetics. He received his B.A. in Chemistry from Swarthmore College in 1960 and a doctorate in 1964 from Rockefeller University, where he returned to serve as president from 1990-91 and faculty member until 1994.

For almost 30 years, Baltimore was a faculty member at Massachusetts Institute of Technology where his early investigations examined the molecular processes underlying the ability of poliovirus to infect cells. This led him to work on other RNA viruses and then to a consideration of how cancer-causing RNA viruses manage to infect and permanently alter a healthy cell. He identified the enzyme reverse transcriptase in the virus particles, thus providing strong evidence for a process of RNA to DNA conversion, the existence of which had been hypothesized some years earlier. Baltimore and Howard Temin (with Renato Dulbecco, for related research) shared the 1975 Nobel Prize in Physiology or Medicine for their discovery, which provided the key to understanding the life-cycle of retroviruses such as HIV. In the following years, he has contributed widely to the understanding of cancer, AIDS and the molecular basis of the immune response.

Baltimore has several outstanding administrative and public policy achievements to his credit. In the mid-1970s, he played an important role in creating a consensus on national science policy regarding recombinant DNA research. He served as founding director of the Whitehead Institute for Biomedical Research at MIT from 1982 until 1990. An early advocate of federal AIDS research, Baltimore co-chaired the 1986 National Academy of Sciences committee on a National Strategy for AIDS and was appointed in 1996 to head the National Institutes of Health AIDS Vaccine Research Committee. Baltimore served as a member of the Independent Citizen's Oversight Committee to the California Institute for Regenerative Medicine until 2007 and on the Board of Directors for MedImmune until 2007, Cellerant until 2008, Calimmune until 2017 and Amgen until 2018.

Baltimore has played an important role in the development of American biotechnology since his involvement in the 1970s in the formation of Collaborative Genetics. He helped found other companies such as Calimmune and Immune Design, and he presently serves on the Board of Directors at several companies and non-profit institutions including the Broad Foundation, Broad Institute, and Regulus Therapeutics. He is a member of numerous Scientific Advisory Boards, including the Broad Institute, Ragon Institute, Regulus Therapeutics and Immune Design. He is a scientific partner to the venture capital firm, The Column Group, and was a director of the Swiss investment company BB Biotech through 2011.

Baltimore's numerous honors include the 1970 Gustave Stern Award in Virology, 1971 Eli Lilly and Co. Award in Microbiology and Immunology, 1999 National Medal of Science, and 2000 Warren Alpert Foundation Prize. He was elected to the National

Academy of Sciences in 1974 and is also a fellow of the American Academy of Arts and Sciences, and a foreign member of both the Royal Society of London and the French Academy of Sciences. He is past-president and chair of the American Association of the Advancement of Science (2007-2009) and was named a fellow of the American Association for Cancer Research (AACR). He has published more than 700 peer-reviewed articles.

Session 2: COVID-19: Its Mutations and Vaccine

Bette Korber

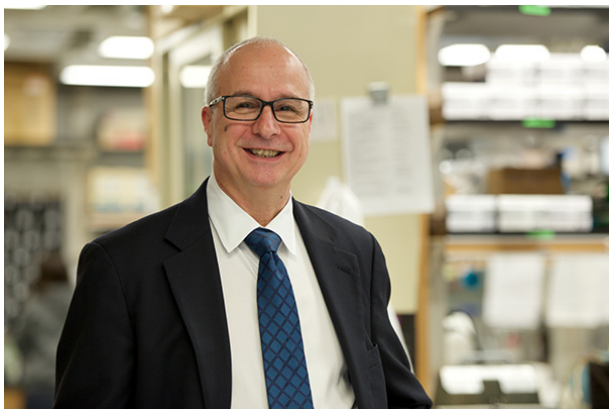
Bette Korber is a Laboratory Fellow at the Los Alamos National Laboratory in the Theoretical Biology and Biophysics group. Her work focuses on viral evolution, the human immune response to infection, and vaccine design. She leads an interdisciplinary team that provides bioinformatics, theoretical and statistical support in collaborative efforts with experimental researchers, working primarily on HIV but also on Filoviruses, hepatitis C and influenza.

Like so many, Korber has recently begun to work on coronaviruses in response to the global pandemic.

Some highlights of her work include vaccine designs to cope with viral diversity, characterizing the evolution of HIV under immune pressure during infection, and developing sequence-based signature analyses methods that include phylogenetic corrections to compensate for founder effects. Her mosaic HIV vaccine design is currently being evaluated in a Phase 2b human clinical trial called Imbokodo.

Some of her awards and honors include the E.O. Lawrence Award, the Department of Energy's highest scientific honor (2004); the Secretary of the Department of Energy Award for her work on the Ebola Task Force (2017); the Richard P. Feynman Innovation Prize (2018); R&D 100 Scientist of the Year (2018); and Battelle's Inventor of the Year (2019).

Discussion



Michael Imperiale

A native of New York City, Michael Imperiale undertook his undergraduate and graduate education at Columbia University, receiving a BA (1976), MA (1978) and PhD (1981) in biological sciences. He went to The Rockefeller University where he became interested in viruses while studying gene regulation in the human pathogen, adenovirus. While there he was supported by postdoctoral fellowships from the Damon Runyon-Walter Winchell Cancer Fund and the National Institutes of Health (NIH).

In 1984, Imperiale joined the Department of Microbiology and Immunology at the University of Michigan as the Arthur F. Thurnau Assistant Professor of Microbiology and Immunology. He was promoted to associate professor (1990) and to professor (1996), and is now the Arthur F. Thurnau Professor of Microbiology and Immunology. He served as interim chair of the Department of Microbiology and Immunology (January 2003–June 2004), and is currently the associate chair. Imperiale served as chair of the Institutional Biosafety Committee (2000–2008) and as director of the Doctoral Program in Cancer Biology (2010–2015) at the University of Michigan.

In 2009, the University of Michigan awarded Imperiale the Distinguished Faculty Achievement Award. He was elected (2010) as a fellow of the American Academy of Microbiology and he became a fellow of the American Association for the Advancement of Science (2011). Imperiale was appointed (2017) as Associate Vice President for Research: Research Policy and Compliance at the University of Michigan.

Imperiale's research interests focus on the study of DNA tumor viruses. He has made important contributions to the understanding of how these viruses regulate expression of their genes, how they contribute to oncogenesis, and how they interact with the infected cell to cause acute disease. Most recently, his laboratory has been examining the behavior of polyomaviruses in healthy individuals and immunosuppressed patients.

Imperiale's work has been funded by the NIH and other federal and private agencies. He published in leading journals in the field. He has presented his findings at numerous national and international conferences, and has served an editor of the Journal of Virology, PLoS Pathogens, and mBio. In 2015, he was appointed as founding editor-in-chief of mSphere, an open access journal published by the American Society for

Microbiology. He has served on several NIH grant review panels, and on National Academies of Science, Engineering, and Medicine committees addressing the issues of responsible conduct of research, dual-use life sciences research and the intersection of science and security. He has published extensively on these topics. These include chairing a published study (2018) entitled, “Biodefense in the Age of Synthetic Biology.”

Imperiale served as an inaugural member of the National Science Advisory Board for Biosecurity (2005–2014) on the Planetary Protection Subcommittee at NASA; on the Committee on Science, Technology, and Law at the National Academies; and the Board of Directors of the Van Andel Institute Graduate School.

Session 3: Lessons from COVID-19: Bio Preparedness and Security for the Next Inevitable Outbreak

Tom Inglesby

Tom Inglesby is the director of the Center for Health Security of the Johns Hopkins Bloomberg School of Public Health. The Center for Health Security is dedicated to protecting people’s health from the consequences of epidemics and disasters. Inglesby is also a professor in the Department of Environmental Health and Engineering in the Johns Hopkins Bloomberg School of Public Health, with a Joint Appointment in the Johns Hopkins School of Medicine.

Inglesby completed his internal medicine and infectious diseases training at Johns Hopkins University School of Medicine, where he also served as Assistant Chief of Service in 1996-97. Inglesby received his MD from Columbia University College of Physicians and Surgeons and his BA from Georgetown University. He sees patients in a weekly infectious disease clinic.

Inglesby's work is internationally recognized in the fields of public health preparedness, pandemic and emerging infectious disease, and prevention of and response to biological threats. He was Chair of the Board of Scientific Counselors, Office of Public Health Preparedness and Response, U.S. Centers for Disease Control and Prevention (CDC) from 2010-2019. He served as Chair of the National Advisory Council of the Robert Wood Johnson Foundation’s National Health Security Preparedness Index. He was a

member of the CDC Director's External Laboratory Safety Workgroup, which examined biosafety practices of the CDC, the National Institutes of Health (NIH), and the Food and Drug Administration (FDA) following high-profile laboratory incidents in federal agencies. He was on the 2016 Working Group assessing U.S. biosecurity on behalf of the President's Council of Advisors on Science and Technology (PCAST). He has served on committees of the Defense Science Board, the National Academies of Sciences, and the Institute of Medicine, and in an advisory capacity to NIH, BARDA, DHS and DARPA. Inglesby has authored or co-authored more than 140 publications, including peer-reviewed research, reports, and commentaries on issues related to health security, preparedness for epidemics, biological threats, and disasters. He is editor-in-chief of the peer-reviewed journal Health Security, which he helped establish in 2003. He was a principal editor of the JAMA book Bioterrorism: Guidelines for Medical and Public Health Management.

Session 4: Post-Pandemic Bioethics

Alta Charo

R. Alta Charo (BA biology, Harvard 1979; JD law, Columbia 1982) is the Warren P. Knowles Professor of Law and Bioethics at the University of Wisconsin. In government, she worked at the former congressional Office of Technology Assessment, the U.S. Agency for International Development and the FDA's Office of the Commissioner. She also was a member of President Clinton's National Bioethics Advisory Commission.

A member of the National Academy of Medicine (NAM), Charo has co-chaired the committees that wrote guidelines for embryonic stem cell research and recommendations for U.S. policy and global principles regarding human genome editing. At present she serves on NAM committees on emerging infectious diseases, on COVID-vaccine allocation frameworks, on emerging science & technology issues, and on science/technology/law. At present, she is also a member of the Nuclear Threat Initiative's Biosecurity Innovation and Risk Reduction project, and of the World Health Organization's committee on global governance of genome editing.

Discussion

Anne-Marie Mazza

Anne-Marie Mazza joined the National Academies in 1995 as a program officer with the Government-University-Industry Research Roundtable; worked with the Committee on Science, Engineering, and Public Policy (COSEMPUP); and then in 1999, under the leadership of Donald Kennedy and Richard Merrill, founded the Committee on Science, Technology, and Law (CSTL).

As director, Mazza has led numerous high profile and influential studies including Securing the Vote — Dual Use Research of Concern in the Life Sciences; Optimizing the Nation's Investment in Academic Research; Identifying the Culprit — Assessing Eyewitness Identification; Positioning Synthetic Biology to Meet the Challenges of the 21st Century; Strengthening Forensic Science in the United States — A Path Forward; and Science and Security in A Post 9/11 World.

Mazza was the study director on the Reference Manual on Scientific Evidence, which is provided to all federal judges. She also was the staff lead on the 2015 and 2018 International Summits on Human Genome Editing. Mazza was a senior policy analyst with the White House Office of Science and Technology Policy (1999–2000) where she directed a presidential review of the government–university research partnership. She directed the Academies' Christine Mirzayan Science and Technology Policy Graduate Fellowship Program (2007–2018) and served as senior director of Strategic Initiatives in the NAM President's Office (2018–2019).

Currently, Mazza directs CSTL and COSEMPUP and is senior leader of the U.S. Science Policy and Innovation Theme. She is a fellow of the American Association for the Advancement of Science. Mazza received a B.A., M.A. and Ph.D. from The George Washington University.