

Anticipating Rare Events of Major Significance: A Workshop

Committee

Christopher L. Barrett

Chair

Christopher L. Barrett is an endowed Distinguished Professor in Biocomplexity, the founding Executive Director of the Biocomplexity Institute, and Professor of the Department of Computer Science at the University of Virginia. Over the past 35 years, Barrett has conceived, founded, and led interdisciplinary complex systems research projects and organizations, established national and international technology programs, and co-founded organizations for federal agencies including: the Department of Defense, the Department of Energy, the Department of Homeland Security and the Department of Transportation. Barrett received the 2012–2013 Jubilee Professorship in Computer Science and Engineering at Chalmers University in Sweden and is a member of the 2010 Royal Colloquium for the King of Sweden. He was a distinguished international professor at the Royal Institute of Technology in Stockholm. He has received Distinguished Research, Service, Advisory and Security Awards from the U.S. Navy, Los Alamos National Laboratory, and the Alliance for Transportation Research. He has served as advisor to U.S. government agencies, the Commonwealth of Virginia, the European Commission, and others. He is the author and co-author of over 100 peer-reviewed papers and presentations. He holds seven patents and has ten pending. Barrett holds a PhD in Bioinformation Systems/Engineering Science and MS in Engineering Science from California Institute of Technology and a U.S. Navy Aerospace Experimental Psychology, Medical Service

David Aldous

Member

David Aldous (NAS) is Professor Emeritus at the Department of Statistics, University of California, Berkeley. Previously he was the Chair 1999–1999, Professor 1986–2018, Associate Professor 1982–1986, and Assistant Professor 1979–1982 at the Department of Statistics, University of California, Berkeley. Dr. Aldous has received numerous awards which includes the Brouwer Medal, 2020; American Mathematical Society Fellow, 2012, and Docteur Honoris Causa de l'Université de Provence, 2011. Dr. Aldous received a B.A. and Ph.D. in Mathematics from Cambridge University in 1973 and 1977, respectively.

Vicki M. Bier

Member

Vicki M. Bier is Professor Emerita in the Department of Industrial and Systems Engineering and the Department of Engineering Physics at the University of Wisconsin-Madison, where she directed the Center for Human Performance and Risk Analysis (formerly the Center for Human Performance in Complex Systems) from 1995 to 2021. She was recently appointed to the Advisory Committee on Reactor Safeguards of the U.S. Nuclear Regulatory Commission. She has over 40 years of experience in risk analysis for the nuclear power, chemical, petrochemical, and aerospace industries, as well as homeland security and critical-infrastructure protection. Dr. Bier's recent research has focused on applications of risk analysis and related methods to problems of security, critical infrastructure protection, and emergency management. Dr. Bier received the Women's Achievement Award from the American Nuclear Society in 1993, and was elected a Fellow of the Society for Risk Analysis in 1996, from which she received the Distinguished Achievement Award in 2007. She is also a Past President of the Decision Analysis Society, and editor-in-chief of the society's flagship journal, Decision Analysis. She has participated in panels, committees, and subcommittees of the National Research Council dealing with radioactive-waste management, and a committee to review the Department of Homeland Security's approach to risk analysis, and served on the Board on Mathematical Sciences and Their Applications from 2014-2016. She received a Ph.D. in operations research from the Massachusetts Institute of Technology in 1983, and a B.S. in mathematical sciences from Stanford University in 1976.

Dan Fukushima

Member

Dan Fukushima is a Director and futurist at Toffler Associates, the firm founded by noted futurist Alvin Toffler. For over thirty years, he has been helping organizations recognize, prepare for, and take advantage of how the future may unfold. His career is a collection of diverse experiences linked by the common thread of disruption. Starting in the airline industry as deregulation, market innovation and new technology took hold, he had a first-hand view that has shaped his perspective on analyzing the future. He further honed his insightful, creative, and pragmatic approach to futures and foresight in work within the financial services, retail, and consumer products industries during disruptive transformations. In recent work across the Department of Defense, Dan has applied this approach to planning the future of Army installations, analyzing the research and manufacturing landscape for DoD science and technology organizations, preparing for climate impacts to CONUS installations, and addressing the future of talent for a military research laboratory. His goal is to help leaders understand how future shifts impact current decisions and anticipate and plan for unique events and disruptive scenarios through analysis and imagination. He is a graduate of the Georgia Institute of Technology.

Justin C. Kasper

Member

Justin C. Kasper is the Deputy Chief Technology Officer for BWX Technologies (BWXT), which is the sole manufacturer of nuclear reactors for the U.S. Navy. He maintains a fractional appointment as Professor in the University of Michigan Department of Climate and Space Sciences and Engineering and was previously a Smithsonian Institution civil servant. Dr. Kasper is an experimental physicist by training, with experience developing electromagnetic and particle sensors and systems for the exploration of space and operation in extreme environments. He is the Principal Investigator of the SWEAP Investigation on Parker Solar Probe and of the six-spacecraft SunRISE Explorer mission. At BWXT his responsibilities include execution of company research and development efforts, management of intellectual property, and the identification of new products and technologies. He has received the Presidential Early Career Award for Scientists and Engineers (2010), the Henry Russel Award (2018), and numerous NASA awards and is a member of the American Geophysical Union and the American Physical Society. He received his AB in Physics from the University of Chicago and PhD in Physics from the Massachusetts Institute of Technology. He served on the Steering Committee of the 2013 Decadal Surface in Solar and Space Physics and is a member of the Intelligence Science and Technology Experts Group.

Cato T. Laurencin

Member

Cato T. Laurencin, M.D., Ph.D., (NAS/NAE/NAM) is a designated University Professor at the University of Connecticut, one of only two currently at the school. He earned his B.S.E. in Chemical Engineering from Princeton University, his M.D., Magna Cum Laude, from the Harvard Medical School and his Ph.D. in Biochemical Engineering/Biotechnology from the Massachusetts Institute of Technology. Dr. Laurencin's life and career have been rooted in his passion for service to our nation. He has been a scholar in discussing issues involving health disparities and social justice, publishing the first peer reviewed article on COVID-19 and Black Americans. His paper on Medical Surprises (Medical Surprise Anticipation and Recognition Capability: A New Concept for Better Health Care), presaged our need to prepare for unexpected medical events such as COVID-19. He has participated in National Academies activities surrounding Anthrax (Review of the Scientific Approaches Used During the FBI's Investigation of the 2001 Anthrax Letters) and our military's capability for surprise (Responding to Capability Surprise Strategy for U.S. Naval Forces (2013)). In addition, Dr. Laurencin is the founder of the field of Regenerative Engineering. He is the first surgeon in history elected to the National Academy of Sciences, the National Academy of Engineering, the National Academy of Medicine, the National Academy of Inventors and the American Academy of Arts and Sciences. He has singular distinctions. In Science, he received the Philip Hauge Abelson Prize from the American Association for the Advancement of Science "for signal contributions to the advancement of science in the United States". In Engineering, he received the Simon Ramo Founders Award from the National Academy of Engineering, its oldest/highest award. In Medicine, he received the Walsh McDermott Medal from the National Academy of Medicine, one its oldest/highest awards, and in Technology he received the National Medal of Technology and Innovation, America's highest honor for technological achievement awarded by the President of the United States.

Alon Orlitsky

Member

Robert N. Schock

Member

Robert Schock is Senior Fellow at the Center for Global Security Research at Lawrence Livermore National Laboratory. He is also co-chair of the Energy, and the Catastrophic Risk Permanent Monitoring Panels for the World Federation of Scientists, and Senior Advisor and the former Director of Studies for the World Energy Council in London. He was a Coordinating Lead Author (Energy Sources) for the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). He was a lead author on the 2012 Global Energy Assessment. For 34 years at Lawrence Livermore National Laboratory (LLNL), he held a number of positions up to and including Associate Director in which he initiated or was responsible for programs in advanced energy technologies including magnetic fusion, hydrogen fuels, geothermal, in-situ coal gasification, oil shale retorting, environmental restoration and nuclear waste management, and energy policy analysis. He was a delegate to the U.S.-Russian bilateral negotiations on nuclear nonproliferation (1999-2000) and worked on verification of the Agreed Framework with North Korea (2001). Schock has served on the editorial boards of five scientific journals and on national scientific panels for the U.S. National Research Council, the Department of Energy, and the National Science Foundation. He was a Senior Fulbright Fellow in Germany and a Visiting Fellow at the Australian National University. He is an author or coauthor of more than 150 scientific and technical papers. He holds a B.S. degree in geology from Colorado College, an M.S. degree in geochemistry from Rensselaer Polytechnic Institute, and a Ph.D. in geophysics also from Rensselaer.

Michele Wucker

Member

Dionna Ali

Staff Officer