Cutting Edge Scientific Capabilities for Biological Detection - A Workshop

Committee

Catherine R. Cabrera

Chair

Catherine R. Cabrera is the Leader of the Biological & Chemical Technologies Group, at MIT Lincoln Laboratory. Dr. Cabrera has been working to address urgent needs in biodefense and pathogen countermeasure for 25+ years, focused on translating research into operational capabilities. Her expertise includes chemical and biological engineering, molecular diagnostics and pathogen ID, systems analysis, and forensics and attribution. She received her B.A. degrees in Biochemistry and Chemical Engineering from Rice University and her Ph.D. in Bioengineering from the University of Washington. Her PhD research was focused on developing fieldable technologies to detect pathogens in resource-limited environments. She maintained that focus when she joined MIT LL in 2002, initially working on hardware and software development for biowarfare agent ID, again for field-forward applications. Dr. Cabrera has been part of several R&D 100 award-winning teams, including one for the PANTHER automated cell-based bioaerosol sensor, which has since transitioned to operational use for building protection and plant pathogen detection. She currently oversees a diverse program portfolio, which includes rapid medical countermeasure development, cyber/bio/AI convergence, molecular biomarkers for heath and performance, connections between the microbiome and human performance, advanced DNA forensics, and engineered and synthetic biology R&D. She is a current member of the National Academies Standing Committee on Biotechnology Capabilities & National Security Needs.

Rocco Casagrande

Member

Dr. Rocco Casagrande currently serves as the Managing Director for Gryphon Scientific. Trained as a biochemist (receiving a PhD from MIT in 2001), Dr. Casagrande has spent the past 20 years applying his deep scientific expertise with novel methodologies to minimize risks arising from the intentional or accidental misuse of biotechnologies. He has led, as Principle Investigator, dozens of projects for the US Federal Government to develop better systems to reduce biorisks. These projects include the systems study underpinning HHS’s Screening Framework Guidance for Providers of Synthetic Double Stranded DNA, the risk assessments detailing needed biorisk management elements at the National Bio- and Agrodefense Facility, and the Risk and Benefit Assessment of Gain of Function Research. Recently, Dr. Casagrande has focused on transforming biosafety from art to science, hoping to prevent accidents that could imperil global health.

Elliot L. Chaikof

Member

Elliot L. Chaikof, M.D., Ph.D., is the Johnson and Johnson Professor of Surgery at Harvard Medical School and serves as Chair of the Department of Surgery and Surgeon-in-Chief at the Beth Israel Deaconess Medical Center. Dr. Chaikof holds a faculty appointment at the Massachusetts Institute of Technology in the Harvard-MIT Division of Health Sciences and Technology and is a member of Harvard Stem Cell Institute, the Wyss Institute of Biologically Inspired Engineering of Harvard University, and the Broad Institute of Harvard and MIT. Dr. Chaikof received his B.A. and M.D. from Johns Hopkins and his Ph.D. in Chemical Engineering from MIT. He completed his training in General Surgery at the Massachusetts General Hospital and in Vascular Surgery at Emory University. Dr. Chaikof's research interests lie at the interface of medicine and engineering. Dr. Chaikof recently served as Chair for Section 1 (Engineering Sciences) in the National Academy of Medicine (NAM) and currently serves as Co-Chair of the Health and Technology Interest Group and on the Committee on Emerging Science, Technology, and Innovation in the NAM. Dr. Chaikof also serves as a member of the National Materials and Manufacturing Board (NMMB), the Committee on Biomedical Engineering Materials and Applications (BEMA), and the Standing Committee of Biotechnology and National Security Needs for the National Academies. Dr. Chaikof has served on multiple classified panels for the National Academy Division on Engineering and Physical Sciences and the Army Research Laboratory Technical Assessment Board (ARLTAB).

Jonathan S. Dordick

Member

Prof. Dordick is an Institute at Rensselaer Polytechnic Institute (RPI) in the Departments of Chemical and Biological Engineering, Biomedical Engineering, and Biological Sciences. He is also Special Advisor to the President for Strategic Initiatives and Director of the Heparin Applied Research Center, a biomanufacturing center at RPI. He recently served as Vice President for Research at RPI. Dr. Dordick has made foundational contributions to gaining a quantitative understanding of biological principles and applying them to advance biomanufacturing, engineering of the natural and durable synthetic immune system, neurotechnologies, and drug discovery. Prof. Dordick received his B.A. degree in Biochemistry and Chemistry from Brandeis University and his Ph.D. in Biochemical Engineering from the Massachusetts Institute of Technology. Prof. Dordick is a member of the National Academy of Engineering and the National Academy of Inventors. He is a Fellow of the American Chemical Society, the American Association for the Advancement of Science, and the American Institute of Medical and Biological Engineers. A selected list of awards he has received include the Amgen Award in Biochemical and Molecular Engineering; Food, Pharmaceutical and Bioengineering Award of the American Institute of Chemical Engineers; Marvin J. Johnson Award and Elmer Gaden Award both of the American Chemical Society; and the International Enzyme Engineering Award. He has cofounded several biotechnology companies, and has served on multiple White House-sponsored panels and committees, including the Advanced Manufacturing Partnership 2.0, and a U.S. Council on Competitiveness Working Committee for Innovation Frontiers. He has published over 420 peer-reviewed papers broadly in biotechnology and is an inventor on 50 patents and patent applications.

Nita Farahany

Member

Dr. Nita A. Farahany is the Robinson O. Everett Distinguished Professor of Law & Philosophy and Founding Director of the Duke Initiative for Science & Society. From 2010-2017, she served as a Commissioner on the U.S. Presidential Commission for the Study of Bioethical Issues. She is a widely published scholar on the ethical, legal, and social implications of the biosciences and emerging technologies, and a frequent commentator for national media and radio shows, and at major event conferences including the Aspen Ideas Festival, TED, the World Economic Forum, and judicial conferences. Farahany is an elected member of the American Law Institute, an elected fellow of the American Association for the Advancement of Science, a member of the World Economic Forum Global Future Council on Frontier Risks, President and Board member of the International Neuroethics Society, serves on scientific and ethics advisory boards, is a member of the Neuroethics Division of the BRAIN Initiative for NIH, an appointed member of the National Advisory Council of NINDS, and the Neuroforum at the National Academies of Science. She is a co-editor-in-chief and a founding editor of the Journal of Law and the Biosciences. Farahany holds an AB (Genetics) from Dartmouth College, an ALM (Biology) from Harvard University, and a JD, MA, and Ph.D. (Philosophy) from Duke University.

Charles D. Gilbert

Member

Dr. Charles D. Gilbert (NAS) is currently the Arthur and Janet Ross Professor and Head of Laboratory of Neurobiology at the Rockefeller University in New York City. He studies how a series of areas in the visual cortex mediate object recognition and perceptual tasks and the way visual experience shapes the strategy by which the cortex analyzes sensory information, a process called perceptual learning. Dr. Gilbert holds an M.D. from Harvard Medical School and a Ph.D. from Harvard University in neurobiology, completing both in 1977. He has worked on brain machine interfaces, molecular pathways of brain plasticity, training programs for perceptual learning, and is applying his discoveries on brain mechanisms of vision to the study and remediation of perceptual deficits in autism. As an undergraduate Dr. Gilbert studied biophysics at Amherst College, graduating in 1971. He was section chair for NAS Section 28: Neuroscience and is currently the NRC liaison for Section 28.