Committee on Biotechnology Capabilities for National Security Needs - Leveraging Advances in Transdisciplinary Biotechnology *Kick-Off Meeting*

May 15, 2024 | 10:30AM – 4:00PM EDT

Wednesday, May 15, 2024

Purpose

The purpose of the first meeting of the Committee on Biotechnology Capabilities for National Security Needs - Leveraging Advances in Transdisciplinary Biotechnology is to

- Receive an overview from the project sponsor
- Conduct the committee bias and conflict of interest discussion
- Determine committee meeting schedule
- Discuss proposed draft outline of the report
- Discuss committee data gathering needs

CLOSED SESSION

10:30–11:00 **Welcome, Introductions, and National Academies Overview**
Nia Johnson, Senior Program Officer, BLS

11:00–11:30 **Statement of Task Overview**
Kavita Berger, Board Director, BLS

OPEN SESSION

11:30–12:30 **Sponsor Overview**
Joe Buccina, Policy and Research Director, NSCEB

CLOSED SESSION

12:30–4:00 **Composition, Balance, and Conflict of Interest Discussion; General Data Gathering**

Committee Biographies

Diane DiEuliis is a Senior Research fellow at National Defense University. She previously served as the Assistant Director for Life Sciences in several administrations in the White House Office of Science and Technology Policy (OSTP). Prior to working at OSTP, DiEuliis was a program director at the National Institutes of Health (NIH), where she managed a diverse portfolio of neuroscience research in neurodegenerative diseases. Her research focuses on emerging biological technologies, biodefense, and preparedness for biothreats. Specific topic areas under this broad research portfolio include dual use life sciences research, synthetic biology, the U.S. bioeconomy, disaster recovery, and behavioral, cognitive, and social science as it relates to important aspects of deterrence and preparedness. DiEuliis received a Ph.D. in biology from the University of Delaware. She completed a fellowship at the University of Pennsylvania in the Center for Neurodegenerative Disease Research and completed postdoctoral research in the NIH Intramural research program, where she focused on cellular and molecular neuroscience. She currently serves as co-chair of the National Academies Standing Committee on Advances and National Security Implications of Transdisciplinary Biotechnology.

James Brase is the Deputy Associate Director for Computing at Lawrence Livermore National Laboratory (LLNL). As the Director of LLNL's Center for Predictive Bioresilience he oversees LLNL research and development in early warning of emerging biothreats, rapid development of medical countermeasures, and other applications of integrated high-performance computing, machine learning, and biotechnologies. Brase was a leader of the Advancing Therapeutic Opportunities in Medicine (ATOM) public-private partnership for small-molecule computational drug discovery and has worked with multiple partners to establish the Generative Unconstrained Intelligent Drug Engineering (GUIDE) program for accelerated design of therapeutic antibodies. In his previous position as LLNL's Deputy Program Director for Intelligence, he led efforts in intelligence and cybersecurity research and development and applications to nuclear nonproliferation. Brase received an M.S. in electrical and computer engineering from the University of California, Davis.

R. Alta Charo is professor emerita of law and bioethics at the University of Wisconsin, and now works as an independent consultant to government and industry on medical and biotechnology ethics, policy and governance related to human therapeutics, agriculture, species conservation and national security. She was a member of President Clinton's National Bioethics Advisory Commission and worked as a legal and policy analyst for the former congressional Office of Technology Assessment, the U.S. Agency for International Development and the Food and Drug Administration. Charo has been elected to the American Association for the Advancement of Science (AAAS) and the American Academy of Arts and Sciences, as well as the National Academy of Medicine (NAM). Charo is a member of the AAAS committee on science, engineering, and public policy, and has consulting contracts with BioMADE, DARPA, Colossal, eGenesis, Vertex, Johnson & Johnson, Gameto, and Warner Bros. Entertainment. She also serves as a member of the National Academies Committee on Science, Technology, and Law (CSTL), and served as co-chair of the Committee on Human Gene Editing: Scientific, Medical and Ethical Considerations and the NAM Committee on Emerging Science, Technology, and Innovation in Health and Medicine (CESTI).

Sara Del Valle is a Senior Scientist and Project Leader in the Information Systems & Modeling Group at Los Alamos National Laboratory (LANL), where she has been a staff member since 2006. Her research focuses on exploiting heterogeneous data and combining them with mathematical, computational, and statistical models to understand, model, and forecast infectious diseases and political instability. Her work has led to new insight on how human behavior affects disease transmission, better understanding on the role of mixing patterns on disease spread, the role of social media to inform nowcasting and forecasting, and pioneered modeling approaches to forecast infectious diseases in real-time. Del Valle has received six distinguished performance awards from LANL, an R&D 100 Award, a Department of Energy Secretary Appreciation Award and her work has been featured in several top media outlets such as National Geographic and NPR Science Friday. Del

Valle has served in several committees for the National Institutes of Health, National Science Foundation, and the European Commission. Del Valle received a B.S. in applied mathematics from the New Jersey Institute of Technology, and a Ph.D. in applied mathematics and computational sciences from the University of Iowa. She currently serves on the National Academies Standing Committee on Advances and National Security Implications of Transdisciplinary Biotechnology.

Jessica S. Dymond is Vice President, Technology, of IQT's B. Next practice. In this role, she provides technical and strategic leadership to identify and accelerate development of high-impact emerging biotechnologies to address critical national security challenges. In her prior role as Chief Scientist for Physical and Life Sciences at the Johns Hopkins University Applied Physics Laboratory (APL), Dymond led an active interdisciplinary research portfolio spanning technological and analytic pursuits to enhance anticipation, assessment, and mitigation of emerging biological threats, including evaluation of emerging biotechnologies' potential impact on national security and health, and integrated health surveillance strategies to strengthen global health security. She founded APL's Biological Sciences group where she led development of technological solutions in areas such as biological sensing, biological synthesis, microbiome engineering, genomic surveillance, and others. Dymond received a Ph.D. in molecular biology and genetics from the Johns Hopkins University School of Medicine and held a postdoctoral fellowship in functional genomics at the United States Department of Agriculture Agricultural Research Service.
Jessica Dymond is employed by IQT, the same organization as one of Commissioners of the National Security Commission on Emerging Biotechnology, which sponsors this activity. Dymond and the Commissioner work in different units of IQT.

Nandi Leslie serves as a Principal Technical Fellow at RTX. She has held additional RTX roles, including the Chief Data Scientist, Chief Engineer for Raytheon Research and Development (R&D), and Technical Director for Cybersecurity. Her R&D interests are focused on machine learning (ML), artificial intelligence (AI), cybersecurity, and autonomy. Since 2020, Leslie has also served as an adjunct professor at Johns Hopkins University in the Applied and Computational Mathematics Program. Leslie received the BEYA Award for Outstanding Technical Contribution in Industry in 2020. She serves as a member of the Princeton University Board of Trustee, and she has served on a number of boards andcommittees, includingthe President's National Security Telecommunications Advisory Committee, Strategy for Increasing Trust in the Information and Communications Technology and Services; Howard University's Center of Excellence in AI and ML Advisory Board; and the Society of Industrial and Applied Mathematics Committee on Programs and Conferences. Leslie received a B.S. in mathematics from Howard University and an M.A. and Ph.D. in applied and computational mathematics from Princeton University. She previously served on the planning committee for the National Academies workshop on AI and Justified Confidence.

Greg McKelvey is a senior physician policy researcher at RAND. His government service includes time at the White House as Assistant Director for Biosecurity at the Office of Science and Technology Policy where he led national security governance and resilience efforts at the intersection of artificial intelligence, automation, and emerging biotechnologies. He also completed a tour as product manager in the United States Digital Service where he was deployed to the Federal COVID-19 pandemic response with a portfolio that included biosurveillance, data aggregation, inference, and strategic decision support. McKelvey has held leadership roles in two venture-backed machine learning startup companies. He was named an Emerging Leader in Biosecurity Fellow by Johns Hopkins in 2020, and a Fellow for Ending Biological Weapons by the Council on Strategic Risks in 2021 (deferred for government service). McKelvey received an M.D. from the Dartmouth Medical School, an MPH from Johns Hopkins Bloomberg School of Public Health, and trained in healthcare delivery at the University of Washington and Albert Einstein College of Medicine.

Sponsor Biography

Congress charged the **National Security Commission on Emerging Biotechnology** with conducting a thorough review of how advancements in emerging biotechnology and related technologies will shape current and future activities of the Department of Defense. The Commission is a legislative branch advisory entity and is expected to provide an interim report to the President and the Armed Services Committees in December 2023 and submit a final, unclassified report in December 2024, including recommendations for action by Congress and the federal government.

Statement of Task

The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc study Committee on Biotechnology Capabilities for National Security Needs, which is associated with the Standing Committee on Advances and National Security Implication of Transdisciplinary Biotechnology, to produce a brief unclassified consensus report and brief, classified addendum highlighting specific actions for:

- The applicability of AI/ML and automated experimentation for biotechnology discovery and development for various applications, including health and medicine, food and agriculture, industrial materials and chemicals, environmental remediation, and energy production for defense.
- The feasibility of developing a research and development network in the United States that drives biotechnology innovation through the combined application of AL/ML, automation, and biology; development and securing of large volumes of high-quality data sets that can support AI/ML for biotechnology defense innovation; and examples wherein the government communicated its needs and specific requirements clearly and effectively, or ineffectively.
- Future defense capabilities, as forecasted by the Defense Department, that could be achieved through innovative biotechnologies.
- Opportunities for using AI/ML and experimental/laboratory automation to prevent misuse of biotechnology.
- Practical or operational factors (e.g., expertise, infrastructure, laboratory capacity, data sources, computing infrastructure, and policy/governance) needed to enable investments needed to reach the goal of a nationwide network research hubs wherein highly innovative research and development on AI/ML, automation, and biotechnology tools are conducted to address defense problems.

The ad hoc study committee will build on the work from the Standing Committee, which will explore related topics in a series of convenings (e.g., workshop and meetings of experts). The ad hoc study committee's report will focus on artificial intelligence and experimental/laboratory automation in biotechnology research.

Background Materials

Report on the Impact of Artificial Intelligence and Associated Technologies on Arms Control, Nonproliferation, and Verification. October 2023. International Security Advisory Board. Department of State. https://www.state.gov/wp-content/uploads/2023/11/ISAB-Report-on-AI-and-Associated-Technologies_11172023-Accessible.pdf.