

Testimony of Deborah Gracio
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Hearing on Pursuing the Golden Age of Innovation: Strategic Priorities in Biotechnology

Chairman Weber, Chairman Obernolte, Ranking Member Ross, Ranking Member Stevens, and members of the Subcommittees, thank you for the opportunity to testify today. My name is Deb Gracio. I am the Associate Laboratory Director for the National Security Directorate at the Pacific Northwest National Laboratory. In this role I oversee a staff of over 1700 professionals who are focused on using our scientific capabilities to address some of our nation's most complex national security challenges.

The report published by the National Security Commission on Emerging Biotechnology (NSCEB) entitled *Charting the Future of Biotechnology*, provides an excellent overview of the current state of US biotechnology and an urgent warning about what will happen if we continue to fall behind in biotechnology innovation. The recommendations in this report, although focused on biotechnology, are consistent with findings in the most recent National Defense Strategy and the Annual Threat Assessment of the United States (US) Intelligence Community. These reports highlight that China is using a whole-of-government approach to become a global leader in bioscience and biotechnology, with significant implications for agriculture, medicine, manufacturing, the economy, and ultimately, our national security.

The DOE national laboratories have a long history of integrating cutting-edge science and national security. It was gratifying to see the role of the laboratories, and our deep expertise in biotechnology, called out in this report. The national laboratories stand ready to serve the nation to address the most challenging problems we face today and into the future.

The current revolution in biotechnology has been enabled by a convergence of disciplines; biology, computing and data science—three areas where the Department of Energy and the national labs are exceptionally strong. For the past three decades, DOE's Office of Science / Biological and Environmental Research programs, BER for short, have focused on furthering a predictive understanding of complex biological systems through a combination of experiment, advanced computing and data analytics. BER-supported research has been

foundational to advances in biotechnology, as have DOE's flagship scientific user facilities such as the Joint Genome Institute at Lawrence Berkeley National Laboratory, which provides DNA sequencing technologies to industry and academia, the Environmental Molecular Sciences Laboratory (EMSL) at Pacific Northwest National Laboratory, which supports the scientific community in their understanding, prediction, and control of function in biological systems, and the Leadership Class Computing Facilities at Argonne and Oak Ridge national laboratories, supported by the DOE Office of Advanced Scientific Computing Research.

Technologies developed at the DOE laboratories and user facilities are driving biotechnology advancements through licensing to US-based companies. For example, technologies developed at the EMSL user facility for precisely measuring biological molecules were transitioned to Agilent, Bruker, and Thermo Fisher Scientific.

Through funding from BER, researchers in EMSL are developing a high-throughput automated biological characterization capability that allows us to quickly and systematically understand and harness microbial systems to produce valuable chemicals, materials, and fuels. This automated capability leverages the same technology that PNNL developed and licensed over a decade ago.

Data is one of the greatest currencies of our scientific economy, and the Bioenergy Research Centers, EMSL, the Joint Genome Institute, and other DOE-supported user facilities and projects generate massive amounts of data. This data can be used as the foundation for the Web of Biological Data recommended in the NSCEB report. As autonomous laboratories accelerate the rate at which data is generated, AI will create new opportunities for data exploration and discovery. The report recognized biological data as a strategic resource that requires both standards and security. Accomplishing these outcomes will require new security models, advanced data science and techniques to federate data across a network of systems. These advanced data technologies are necessary to mine the vast data sources to accelerate the discovery and translation of biological systems to useful technological outcomes. Standards, security, and advanced data analytics are all areas where DOE, and the DOE national laboratories, possess cutting-edge capabilities that can be brought to bear.

In my capacity as PNNL's Associate Laboratory Director for National Security, I particularly valued the emphasis the NSCEB report placed on security. The national laboratories welcome the opportunity to help define new protection mechanisms for biotechnology data, and to utilize a systems-based approach to understand and mitigate the risks of technology weaponization. We also understand the importance of ensuring that the nation realizes the benefits of biotechnology.

DOE has a track record of promoting open innovation, while building secure systems to protect sensitive or classified information and performing analyses to understand potential adverse or unintended consequences. Collaboration with the broader scientific community is critical to achieving broad advancements in biotechnology. The national laboratories are well versed in adapting these advancements in support of federal agencies' missions in biodetection and biodefense. As the Commission report highlighted, infrastructure advances that allow the national laboratories to do this research safely and securely will be critical.

Open biotechnology research sponsored by DOE and performed at DOE national laboratories creates far-reaching and revolutionary outcomes, such as the innovations in DNA sequencing and informatics made in the 1990s that underpin our ability to understand the genome today. Similarly, these programs also create the skilled workforce we need to be globally competitive.

As the Commission report emphasizes, the United States cannot afford to lose the biotechnology revolution. Research sponsored by DOE and performed at the DOE national laboratories has been fundamental to biotechnology innovation for decades and will be a critical tool for securing our future competitiveness. The Commission report's recommendations to expand biotechnology research at DOE national laboratories and to utilize the laboratories to develop mitigations for biotechnology risks and counter its weaponization are prudent and timely, and we welcome the opportunity to continue to assist in these important areas.

Thank you for the opportunity to testify today. I look forward to answering any questions you may have.