119TH CONGRESS
1ST SESSION

S. 2676

To require the Director of the National Science Foundation to carry out a cloud laboratory network program, and for other purposes.

IN THE SENATE OF THE UNITED STATES

AUGUST 1, 2025

Mr. YOUNG (for himself and Mr. KIM) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To require the Director of the National Science Foundation to carry out a cloud laboratory network program, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Cloud Labs to Advance Biotechnology Act of 2025'' or the ''Cloud LAB Act of 2025''.

SEC. 2. DEFINITIONS.

In this Act:

(1) ARTIFICIAL INTELLIGENCE.—The term ''artificial intelligence'' has the meaning given such term in section 5002 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 9401).

(2) AUTHORIZED RESEARCH.—The term ''authorized researcher'' means an individual who has been appropriately authorized to access data generated by the cloud laboratories through a process established by the Director in establishing the cloud laboratory network.

(3) BIOLOGICAL DATA.—The term ''biological data'' means the information, including associated descriptors, derived from the structure, function, or process of a biological system that is either measured, collected, or aggregated for analysis.

(4) CLOUD LABORATORY.—The term ''cloud laboratory'' means a physical laboratory that is equipped with research instrumentation and advanced robots that can be programmed and controlled remotely by scientists in order to conduct continuous experiments and collect associated data.

(5) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(6) PHASE II CLOUD LABORATORY.—The term ''phase II cloud laboratory'' means a cloud laboratory funded by a grant awarded under section 3(c).

(7) PHASE III CLOUD LABORATORY.—The term ''phase III cloud laboratory'' means a cloud laboratory funded by a grant awarded under section 3(d).

(8) UNDER SECRETARY.—The term ''Under Secretary'' means the Under Secretary of Commerce for Standards and Technology and Director of the National Institute of Standards and Technology.

SEC. 3. CLOUD LABORATORY NETWORK PILOT PROGRAM.

(a) PROGRAM ESTABLISHED.—

(1) AUTHORIZATION.—The Director, in consultation with the Secretary of Energy, and the Under Secretary, shall carry out a pilot program in accordance with this section that establishes a cloud laboratory network that helps to coordinate the activities of cloud laboratories established by the Director and cloud laboratories independently operated by other entities (such as private industry, government laboratories, and academic institutions), to further the purposes described in paragraph (3).

(2) CONSULTATION.—The Director shall consult, to the greatest extent practicable, with other departments and agencies involved with cloud lab-

oratories, and any government entities responsible for interagency consultation of biotechnology, such as that in the Executive Office of the President, to deduplicate efforts from different programs, and to increase awareness and connectivity of the cloud laboratory network established under subsection (b)(1).

(3) PURPOSE OF THE CLOUD LABORATORY NETWORK.—The cloud laboratory network described in paragraph (1) shall—

(A) serve the purpose of tracking and cataloging the different biotechnology capabilities at each cloud laboratory;

(B) help researchers connect to the capabilities needed to pursue a line of research; and

(C) provide the opportunity for cloud laboratories to connect and collaborate on best practices, including data collection and data sharing, data standards, and needs.

(4) CLOUD LABORATORY PURPOSES.—Each cloud laboratory supported under this section shall accomplish the following purposes:

(A) Generate high-quality biological data through automated experimentation that will be collected for use and analysis by authorized researchers for the purposes of training artificial

intelligence models or other types of biological data analysis models.

(B) Provide researchers access to high-quality experimental instrumentation and data collection for the purposes of advancing individual research projects.

(b) PHASE I OF CLOUD LABORATORY NETWORK PILOT PROGRAM.—

(1) ESTABLISHMENT OF THE CLOUD LABORATORY NETWORK.—Not later than 360 days after the date of enactment of this Act, the Director, in consultation with the Secretary of Energy and the Under Secretary, shall establish the cloud laboratory network as described in subsection (a)(1).

(2) IMPLEMENTATION PLAN.—Not later than 360 days after the date of enactment of this Act, the Director, in consultation with the Secretary of Energy, the Under Secretary, and others as appropriate, shall prepare and submit an implementation plan to Congress that includes the following:

(A) An assessment of the state of public and private cloud laboratories in the United States, particularly cloud laboratories focused on biotechnology, as of the date of the report, including the number of cloud laboratories, the

location of the cloud laboratories, and the financing or payment mechanism for each cloud laboratory.

(B) An implementation plan for a national cloud laboratory network and an associated grant program that includes a mechanism for deciding on the location of each cloud laboratory funded under the grant program in this section.

(C) A plan to coordinate the network of cloud laboratories that are already established, in addition to those funded under this section.

(D) A plan outlining how data generated through the cloud laboratories will be stored, published, and made available and accessible to authorized researchers as a public resource, including a plan to have the data made publicly available in a secure and accessible format.

(E) A scheme for access to data generated through the cloud laboratories funded under this section and the payment or subscription model that will be required to access the cloud laboratory infrastructure and such data, which—

(i) describes how users can apply and use the infrastructure for the cloud laboratories funded under this section, giving special consideration toward providing equitable access;

(ii) allows users doing nonproprietary work to access such cloud laboratories at no or minimal cost; and

(iii) includes a request for information to industry to understand what companies would need in order to subscribe to such a data generation service.

(F) An outline of sample intellectual property agreements for the cloud laboratories funded under this section related to all data gathering and experimentation, which may include different agreements in order to further the different purposes described in subsection (a)(2).

(G) A plan for engagement with industry and academic institutions that manage cloud laboratories to include them in the cloud laboratory network.

(H) A plan for building in considerations related to cybersecurity, biosecurity, and re-

search security from the beginning of development for each cloud laboratory.

(I) The estimated cost of carrying out the full pilot program establishing the cloud laboratory network broken down by year.

(3) CLOUD LABORATORY ADVISORY BOARD.—

(A) CONSULTATION.—In preparing the implementation plan under paragraph (2), the Director shall consult with the advisory board established under this paragraph.

(B) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this Act, the Director shall establish, and lead, a cloud laboratory advisory board (referred to in this paragraph as the ''advisory board'').

(C) MEMBERS.—

(i) COMPOSITION.—The advisory board shall consist of—

(I) employees of the National Science Foundation and employees of such other Federal agencies as the Director determines appropriate;

(II) academic researchers in all areas of biotechnology, including computational biology, synthetic biology,

cell biology, structural biology, robotics, and analytical chemistry;

(III) researchers and practitioners in the fields of biosafety, biosecurity, ethics, and relevant social science disciplines; and

(IV) industry representatives from different sectors of biotechnology, including health, agriculture, chemical production, and platform technologies.

(ii) SELECTION.—The selection and number of people on the advisory board shall be at the discretion of the Director.

(D) DUTIES.—The advisory board shall—

(i) propose biological data collection priorities through consultation with the biotechnology research community, including academia and private companies;

(ii) advise in ways that the cloud laboratories funded under this section are developed and expanded in such a way that maximizes usability across the disciplines of biotechnology while minimizing duplica-

tion across the network of cloud laboratories funded under this section;

(iii) advise on the definition of authorized researcher to ensure research security, but also allow access to all tiers of research and teaching institutions, including primarily undergraduate institutions, minority-serving institutions, and historically Black colleges and universities;

(iv) produce an annual report outlining all recommendations and actions that were taken over the course of the year; and

(v) provide guidance and recommendations to the Director regarding—

(I) ensuring that appropriate safeguards are in place to prevent the misuse of cloud laboratories funded under this section;

(II) ensuring the implementation of a rigorous cybersecurity scheme across the network of such cloud laboratories;

(III) ensuring that access to the cloud laboratories funded under this section is equitable; and

(IV) ensuring that such cloud laboratories appreciably increase access to high-end laboratory equipment to otherwise underresourced entities.

(E) TERMINATION.—The advisory board shall terminate on the date that is 12 years after the date of enactment of this Act.

(c) PHASE II CLOUD LABORATORY AWARDS.—

(1) AWARDS AUTHORIZED.—Not later than 2 years after the date of enactment of this Act, and subject to the availability of appropriations, the Director, in consultation with the Secretary of Energy, the Under Secretary, and the relevant individual in the Executive Office of the President responsible for coordinating interagency efforts related to biotechnology, shall, using the process developed in subsection (b)(2)(B), make grant awards, on a competitive basis, for the development and operation of not fewer than 2 cloud laboratories.

(2) OPERATIONAL DEADLINE.—Each phase II cloud laboratory shall be fully operational by the

date that is 3 years after the date of enactment of this Act.

(3) DURATION.—An award under this subsection for a phase II cloud laboratory shall be for not less than an 8-year period.

(d) PHASE III CLOUD LABORATORY AWARDS.—

(1) AWARDS AUTHORIZED.—Not later than 4 years after the date of enactment of this Act, and subject to the availability of appropriations, the Director, in consultation with the Secretary of Energy and the Under Secretary, shall make grant awards, on a competitive basis, for the development and operation of not fewer than 3 cloud laboratories.

(2) RELATIONSHIP TO PHASE II CLOUD LABORATORIES.—The phase III cloud laboratories shall be separate, and in addition to, the phase II cloud laboratories.

(3) DURATION.—An award under this subsection for a phase III cloud laboratory shall be for not less than a 6-year period.

(4) AWARD BASIS.—In making awards under this subsection, the Director shall utilize a similar competitive process as used for awards for phase II cloud laboratories, which may be adjusted based on

lessons learned from the establishment of the phase II cloud laboratories.

(e) CLOUD LABORATORY PILOT AWARD PROGRAM IMPLEMENTATION REPORTS.—Beginning 1 year after the date on which all awards are made for phase II cloud laboratories, and annually thereafter, the Director shall prepare and submit a report to Congress regarding the progress, including any successes, of all cloud laboratories supported under the pilot grant program under this section.

(f) SUNSET.—This section shall cease to have effect on the date that is 12 years after the date of enactment of this Act.

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