

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

A BILL

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

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Cloud Labs to Advance
5 Biotechnology Act of 2025” or the “Cloud LAB Act of
6 2025”.

7 **SEC. 2. DEFINITIONS.**

8 In this Act:

1 (1) ARTIFICIAL INTELLIGENCE.—The term “ar-
2 tificial intelligence” has the meaning given such
3 term in section 5002 of the William M. (Mac)
4 Thornberry National Defense Authorization Act for
5 Fiscal Year 2021 (15 U.S.C. 9401).

6 (2) AUTHORIZED RESEARCH.—The term “au-
7 thorized researcher” means an individual who has
8 been appropriately authorized to access data gen-
9 erated by the cloud laboratories through a process
10 established by the Director in establishing the cloud
11 laboratory network.

12 (3) BIOLOGICAL DATA.—The term “biological
13 data” means the information, including associated
14 descriptors, derived from the structure, function, or
15 process of a biological system that is either meas-
16 ured, collected, or aggregated for analysis.

17 (4) CLOUD LABORATORY.—The term “cloud
18 laboratory” means a physical laboratory that is
19 equipped with research instrumentation and ad-
20 vanced robots that can be programmed and con-
21 trolled remotely by scientists in order to conduct
22 continuous experiments and collect associated data.

23 (5) DIRECTOR.—The term “Director” means
24 the Director of the National Science Foundation.

1 (6) PHASE II CLOUD LABORATORY.—The term
2 “phase II cloud laboratory” means a cloud labora-
3 tory funded by a grant awarded under section 3(e).

4 (7) PHASE III CLOUD LABORATORY.—The term
5 “phase III cloud laboratory” means a cloud labora-
6 tory funded by a grant awarded under section 3(d).

7 (8) UNDER SECRETARY.—The term “Under
8 Secretary” means the Under Secretary of Commerce
9 for Standards and Technology and Director of the
10 National Institute of Standards and Technology.

11 **SEC. 3. CLOUD LABORATORY NETWORK PILOT PROGRAM.**

12 (a) PROGRAM ESTABLISHED.—

13 (1) AUTHORIZATION.—The Director, in con-
14 sultation with the Secretary of Energy, and the
15 Under Secretary, shall carry out a pilot program in
16 accordance with this section that establishes a cloud
17 laboratory network that helps to coordinate the ac-
18 tivities of cloud laboratories established by the Di-
19 rector and cloud laboratories independently operated
20 by other entities (such as private industry, govern-
21 ment laboratories, and academic institutions), to fur-
22 ther the purposes described in paragraph (3).

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

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

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

10 (A) serve the purpose of tracking and cata-
11 logging the different biotechnology capabilities at
12 each cloud laboratory;

13 (B) help researchers connect to the capa-
14 bilities needed to pursue a line of research; and

15 (C) provide the opportunity for cloud lab-
16 oratories to connect and collaborate on best
17 practices, including data collection and data
18 sharing, data standards, and needs.

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

22 (A) Generate high-quality biological data
23 through automated experimentation that will be
24 collected for use and analysis by authorized re-
25 searchers for the purposes of training artificial

1 intelligence models or other types of biological
2 data analysis models.

3 (B) Provide researchers access to high-
4 quality experimental instrumentation and data
5 collection for the purposes of advancing indi-
6 vidual research projects.

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

9 (1) ESTABLISHMENT OF THE CLOUD LABORA-
10 TORY NETWORK.—Not later than 360 days after the
11 date of enactment of this Act, the Director, in con-
12 sultation with the Secretary of Energy and the
13 Under Secretary, shall establish the cloud laboratory
14 network as described in subsection (a)(1).

15 (2) IMPLEMENTATION PLAN.—Not later than
16 360 days after the date of enactment of this Act, the
17 Director, in consultation with the Secretary of En-
18 ergy, the Under Secretary, and others as appro-
19 priate, shall prepare and submit an implementation
20 plan to Congress that includes the following:

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

1 location of the cloud laboratories, and the fi-
2 nancing or payment mechanism for each cloud
3 laboratory.

4 (B) An implementation plan for a national
5 cloud laboratory network and an associated
6 grant program that includes a mechanism for
7 deciding on the location of each cloud labora-
8 tory funded under the grant program in this
9 section.

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

13 (D) A plan outlining how data generated
14 through the cloud laboratories will be stored,
15 published, and made available and accessible to
16 authorized researchers as a public resource, in-
17 cluding a plan to have the data made publicly
18 available in a secure and accessible format.

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

1 (i) describes how users can apply and
2 use the infrastructure for the cloud labora-
3 tories funded under this section, giving
4 special consideration toward providing eq-
5 uitable access;

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

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

13 (F) An outline of sample intellectual prop-
14 erty agreements for the cloud laboratories fund-
15 ed under this section related to all data gath-
16 ering and experimentation, which may include
17 different agreements in order to further the dif-
18 ferent purposes described in subsection (a)(2).

19 (G) A plan for engagement with industry
20 and academic institutions that manage cloud
21 laboratories to include them in the cloud labora-
22 tory network.

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

1 search security from the beginning of develop-
2 ment for each cloud laboratory.

3 (I) The estimated cost of carrying out the
4 full pilot program establishing the cloud labora-
5 tory network broken down by year.

6 (3) CLOUD LABORATORY ADVISORY BOARD.—

7 (A) CONSULTATION.—In preparing the im-
8 plementation plan under paragraph (2), the Di-
9 rector shall consult with the advisory board es-
10 tablished under this paragraph.

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

16 (C) MEMBERS.—

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

19 (I) employees of the National
20 Science Foundation and employees of
21 such other Federal agencies as the Di-
22 rector determines appropriate;

23 (II) academic researchers in all
24 areas of biotechnology, including com-
25 putational biology, synthetic biology,

1 cell biology, structural biology, robot-
2 ics, and analytical chemistry;

3 (III) researchers and practi-
4 tioners in the fields of biosafety, bio-
5 security, ethics, and relevant social
6 science disciplines; and

7 (IV) industry representatives
8 from different sectors of bio-
9 technology, including health, agri-
10 culture, chemical production, and
11 platform technologies.

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

15 (D) DUTIES.—The advisory board shall—

16 (i) propose biological data collection
17 priorities through consultation with the
18 biotechnology research community, includ-
19 ing academia and private companies;

20 (ii) advise in ways that the cloud lab-
21 oratories funded under this section are de-
22 veloped and expanded in such a way that
23 maximizes usability across the disciplines
24 of biotechnology while minimizing duplica-

1 tion across the network of cloud labora-
2 tories funded under this section;

3 (iii) advise on the definition of author-
4 ized researcher to ensure research security,
5 but also allow access to all tiers of research
6 and teaching institutions, including pri-
7 marily undergraduate institutions, minor-
8 ity-serving institutions, and historically
9 Black colleges and universities;

10 (iv) produce an annual report out-
11 lining all recommendations and actions
12 that were taken over the course of the
13 year; and

14 (v) provide guidance and rec-
15 ommendations to the Director regarding—

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

20 (II) ensuring the implementation
21 of a rigorous cybersecurity scheme
22 across the network of such cloud lab-
23 oratories;

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

4 (IV) ensuring that such cloud
5 laboratories appreciably increase ac-
6 cess to high-end laboratory equipment
7 to otherwise underresourced entities.

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

11 (c) PHASE II CLOUD LABORATORY AWARDS.—

12 (1) AWARDS AUTHORIZED.—Not later than 2
13 years after the date of enactment of this Act, and
14 subject to the availability of appropriations, the Di-
15 rector, in consultation with the Secretary of Energy,
16 the Under Secretary, and the relevant individual in
17 the Executive Office of the President responsible for
18 coordinating interagency efforts related to bio-
19 technology, shall, using the process developed in sub-
20 section (b)(2)(B), make grant awards, on a competi-
21 tive basis, for the development and operation of not
22 fewer than 2 cloud laboratories.

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

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

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

6 (d) PHASE III CLOUD LABORATORY AWARDS.—

7 (1) AWARDS AUTHORIZED.—Not later than 4
8 years after the date of enactment of this Act, and
9 subject to the availability of appropriations, the Di-
10 rector, in consultation with the Secretary of Energy
11 and the Under Secretary, shall make grant awards,
12 on a competitive basis, for the development and op-
13 eration of not fewer than 3 cloud laboratories.

14 (2) RELATIONSHIP TO PHASE II CLOUD LAB-
15 ORATORIES.—The phase III cloud laboratories shall
16 be separate, and in addition to, the phase II cloud
17 laboratories.

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

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

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

3 (e) CLOUD LABORATORY PILOT AWARD PROGRAM
4 IMPLEMENTATION REPORTS.—Beginning 1 year after the
5 date on which all awards are made for phase II cloud lab-
6 oratories, and annually thereafter, the Director shall pre-
7 pare and submit a report to Congress regarding the
8 progress, including any successes, of all cloud laboratories
9 supported under the pilot grant program under this sec-
10 tion.

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

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