

NATIONAL PROGRAMMABLE CLOUD LABORATORIES NETWORK ACT

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BLUF: The National Programmable Cloud Laboratories Network Act of 2025 seeks to establish a cloud network to enhance research efficiency, innovation, and collaboration using artificial intelligence. By creating a programmable cloud laboratory (PCL) network, barriers to research and testing across different fields will be reduced and collaboration between institutions can be enhanced.

Background:

- In July 2025, the Trump Administration released their “AI Action Plan,” with policy recommendations to ensure American dominance in AI innovation. AI offers an array of applications in the field of science and engineering and could vastly lower costs while also increasing the scale of experimentation.¹
- The action plan calls for investments in “automated cloud-enabled labs” by federal partners such as the in coordination and collaboration with private sector and other research institutions.
- The National Science Foundation (NSF) has called for the establishment of a Programmable Cloud Laboratory (PCL) Test Bed consisting of a network of Programmable Cloud Laboratory Nodes (PCL Nodes) with the objective of accelerating automated science and engineering.²

Solutions and Provisions:

- NSF will select no more than 6 programmable cloud laboratories equipped with research instrumentation and advanced manufacturing capabilities, including robotics and artificial intelligence, that can be securely and remotely programmed and controlled to conduct experiments and collect data.
 - The 6 labs may be chosen from applicants who are either academic institutions, nonprofit, private sector research entities, or a consortium of any of the three.
- National Institute of Standards and Technology (NIST) would set standards and report to Congress on the feasibility of potentially expanding the network beyond the initial 6 selected applications.
- The bill also requires annual briefings to Congress (House SST & Senate CST) re: the progress of the network towards self-sustainability, program performance, and alignment of supported research with national scientific and economic priorities.³

Cloud Lab Applications:

- Researchers at Carnegie Mellon and UNC recently developed methods using machine learning (ML) and human chemists in tandem to discover new polymers more quickly ⁴. With a national PCL network, similar efforts could be undertaken at other institutions, regardless of location.

For further information or to cosponsor, please contact nick_borgaonkar@fetterman.senate.gov and Charlie_Hobbs@Budd.Senate.gov

¹ [America’s AI Action Plan](#)

² [NSF 25-541: Test Bed: Toward a Network of Programmable Cloud Laboratories \(PCL Test Bed\) | NSF - U.S. National Science Foundation](#)

³ [BOM25708.pdf](#)

⁴ https://www.cmu.edu/chemistry/news/2025/0922_machine-learning-polymer-discovery.html