



1 matics, and philosophy, is building a better under-  
2 standing of how new technologies are shaping the  
3 society and economy of the United States.

4 (3) The National Science Foundation has iden-  
5 tified the “10 Big Ideas for NSF Future Invest-  
6 ment” including “Harnessing the Data Revolution”  
7 and the “Future of Work at the Human-Technology  
8 Frontier”, in with artificial intelligence is a critical  
9 component.

10 (4) The outputs generated by generative adver-  
11 sarial networks should be included under the um-  
12 brella of research described in paragraph (3) given  
13 the grave national security and societal impact po-  
14 tential of such networks.

15 (5) Generative adversarial networks are not  
16 likely to be utilized as the sole technique of artificial  
17 intelligence or machine learning capable of creating  
18 credible deepfakes and other comparable techniques  
19 may be developed in the future to produce similar  
20 outputs.

21 **SEC. 3. NSF SUPPORT OF RESEARCH ON MANIPULATED OR**  
22 **SYNTHESIZED CONTENT AND INFORMATION**  
23 **SECURITY.**

24 The Director of the National Science Foundation, in  
25 consultation with other relevant Federal agencies, shall

1 support merit-reviewed and competitively awarded re-  
2 search on manipulated or synthesized content and infor-  
3 mation authenticity, which may include—

4 (1) fundamental research on digital forensic  
5 tools or other technologies for verifying the authen-  
6 ticity of information and detection of manipulated or  
7 synthesized content, including content generated by  
8 generative adversarial networks;

9 (2) social and behavioral research related to  
10 manipulated or synthesized content, including the  
11 ethics of the technology and human engagement  
12 with the content; and

13 (3) research awards coordinated with other fed-  
14 eral agencies and programs including the Net-  
15 working and Information Technology Research and  
16 Development Program, the Defense Advanced Re-  
17 search Projects Agency and the Intelligence Ad-  
18 vanced Research Projects Agency.

19 **SEC. 4. NIST SUPPORT FOR RESEARCH AND STANDARDS ON**  
20 **GENERATIVE ADVERSARIAL NETWORKS.**

21 (a) IN GENERAL.—The Director of the National In-  
22 stitute of Standards and Technology shall support re-  
23 search for the development of measurements and stand-  
24 ards necessary to accelerate the development of the tech-  
25 nological tools to examine the function and outputs of gen-

1 erative adversarial networks or other technologies that  
2 synthesize or manipulate content.

3 (b) OUTREACH.—The Director of the National Insti-  
4 tute of Standards and Technology shall conduct out-  
5 reach—

6 (1) to receive input from private, public, and  
7 academic stakeholders on fundamental measure-  
8 ments and standards research necessary to examine  
9 the function and outputs of generative adversarial  
10 networks; and

11 (2) to consider the feasibility of an ongoing  
12 public and private sector engagement to develop vol-  
13 untary standards for the function and outputs of  
14 generative adversarial networks or other technologies  
15 that synthesize or manipulate content.

16 **SEC. 5. REPORT ON FEASIBILITY OF PUBLIC-PRIVATE**  
17 **PARTNERSHIP TO DETECT MANIPULATED OR**  
18 **SYNTHESIZED CONTENT.**

19 Not later than one year after the date of the enact-  
20 ment of this Act, the Director of the National Science  
21 Foundation and the Director of the National Institute of  
22 Standards and Technology shall jointly submit to the  
23 Committee on Space, Science, and Technology of the  
24 House of Representatives and the Committee on Com-  
25 merce, Science, and Transportation a report containing—

1           (1) the Directors’ findings with respect to the  
2           feasibility for research opportunities with the private  
3           sector, including digital media companies to detect  
4           the function and outputs of generative adversarial  
5           networks or other technologies that synthesize or  
6           manipulate content; and

7           (2) any policy recommendations of the Direc-  
8           tors that could facilitate and improve communication  
9           and coordination between the private sector, the Na-  
10          tional Science Foundation, and relevant Federal  
11          agencies through the implementation of innovative  
12          approaches to detect digital content produced by  
13          generative adversarial networks or other technologies  
14          that synthesize or manipulate content.

15 **SEC. 6. GENERATIVE ADVERSARIAL NETWORK DEFINED.**

16          In this Act, the term “generative adversarial net-  
17          work” means, with respect to artificial intelligence, the  
18          machine learning process of attempting to cause a gener-  
19          ator artificial neural network (referred to in this para-  
20          graph as the “generator” and a discriminator artificial  
21          neural network (referred to in this paragraph as a “dis-  
22          criminator”) to compete against each other to become  
23          more accurate in their function and outputs, through  
24          which the generator and discriminator create a feedback  
25          loop, causing the generator to produce increasingly higher-

- 1 quality artificial outputs and the discriminator to increas-
- 2 ingly improve in detecting such artificial outputs.

Amend the title so as to read: “A bill to direct the Director of the National Science Foundation to support research on manipulated or synthesized content and information authenticity, including the output of generative adversarial networks, otherwise known as deepfakes, and for other purposes”.

