

116TH CONGRESS  
2D SESSION

# S. 2904

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## AN ACT

To direct the Director of the National Science Foundation to support research on the outputs that may be generated by generative adversarial networks, otherwise known as deepfakes, and other comparable techniques that may be developed in the future, 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 “Identifying Outputs  
5        of Generative Adversarial Networks Act” or the “IOGAN  
6        Act”.

7        **SEC. 2. FINDINGS.**

8        Congress finds the following:

9            (1) Gaps currently exist on the underlying re-  
10          search needed to develop tools that detect videos,  
11          audio files, or photos that have manipulated or syn-  
12          thesized content, including those generated by gen-  
13          erative adversarial networks. Research on digital  
14          forensics is also needed to identify, preserve, recover,  
15          and analyze the provenance of digital artifacts.

16          (2) The National Science Foundation’s focus to  
17          support research in artificial intelligence through  
18          computer and information science and engineering,  
19          cognitive science and psychology, economics and  
20          game theory, control theory, linguistics, mathe-  
21          matics, and philosophy, is building a better under-  
22          standing of how new technologies are shaping the  
23          society and economy of the United States.

24          (3) The National Science Foundation has iden-  
25          tified the “10 Big Ideas for NSF Future Invest-

1       ment” including “Harnessing the Data Revolution”  
 2       and the “Future of Work at the Human-Technology  
 3       Frontier”, with artificial intelligence is a critical  
 4       component.

5           (4) The outputs generated by generative adver-  
 6       sarial networks should be included under the um-  
 7       brella of research described in paragraph (3) given  
 8       the grave national security and societal impact po-  
 9       tential of such networks.

10          (5) Generative adversarial networks are not  
 11       likely to be utilized as the sole technique of artificial  
 12       intelligence or machine learning capable of creating  
 13       credible deepfakes. Other techniques may be devel-  
 14       oped in the future to produce similar outputs.

15   **SEC. 3. NSF SUPPORT OF RESEARCH ON MANIPULATED OR**  
 16                   **SYNTHESIZED CONTENT AND INFORMATION**  
 17                   **SECURITY.**

18       The Director of the National Science Foundation, in  
 19       consultation with other relevant Federal agencies, shall  
 20       support merit-reviewed and competitively awarded re-  
 21       search on manipulated or synthesized content and infor-  
 22       mation authenticity, which may include—

23           (1) fundamental research on digital forensic  
 24       tools or other technologies for verifying the authen-  
 25       ticity of information and detection of manipulated or

1 synthesized content, including content generated by  
2 generative adversarial networks;

3 (2) fundamental research on technical tools for  
4 identifying manipulated or synthesized content, such  
5 as watermarking systems for generated media;

6 (3) social and behavioral research related to  
7 manipulated or synthesized content, including  
8 human engagement with the content;

9 (4) research on public understanding and  
10 awareness of manipulated and synthesized content,  
11 including research on best practices for educating  
12 the public to discern authenticity of digital content;  
13 and

14 (5) research awards coordinated with other fed-  
15 eral agencies and programs, including the Defense  
16 Advanced Research Projects Agency and the Intel-  
17 ligence Advanced Research Projects Agency, with co-  
18 ordination enabled by the Networking and Informa-  
19 tion Technology Research and Development Pro-  
20 gram.

21 **SEC. 4. NIST SUPPORT FOR RESEARCH AND STANDARDS ON**  
22 **GENERATIVE ADVERSARIAL NETWORKS.**

23 (a) IN GENERAL.—The Director of the National In-  
24 stitute of Standards and Technology shall support re-  
25 search for the development of measurements and stand-

ards necessary to accelerate the development of the technological tools to examine the function and outputs of generative adversarial networks or other technologies that synthesize or manipulate content.

(b) OUTREACH.—The Director of the National Institute of Standards and Technology shall conduct outreach—

(1) to receive input from private, public, and academic stakeholders on fundamental measurements and standards research necessary to examine the function and outputs of generative adversarial networks; and

(2) to consider the feasibility of an ongoing public and private sector engagement to develop voluntary standards for the function and outputs of generative adversarial networks or other technologies that synthesize or manipulate content.

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

Not later than 1 year after the date of enactment of this Act, the Director of the National Science Foundation and the Director of the National Institute of Standards and Technology shall jointly submit to the Committee on Science, Space, and Technology of the House of Rep-

1 representatives, the Subcommittee on Commerce, Justice,  
 2 Science, and Related Agencies of the Committee on Appro-  
 3 priations of the House of Representatives, the Committee  
 4 on Commerce, Science, and Transportation of the Senate,  
 5 and the Subcommittee on Commerce, Justice, Science,  
 6 and Related Agencies of the Committee on Appropriations  
 7 of the Senate a report containing—

8           (1) the Directors’ findings with respect to the  
 9           feasibility for research opportunities with the private  
 10          sector, including digital media companies to detect  
 11          the function and outputs of generative adversarial  
 12          networks or other technologies that synthesize or  
 13          manipulate content; and

14          (2) any policy recommendations of the Direc-  
 15          tors that could facilitate and improve communication  
 16          and coordination between the private sector, the Na-  
 17          tional Science Foundation, and relevant Federal  
 18          agencies through the implementation of innovative  
 19          approaches to detect digital content produced by  
 20          generative adversarial networks or other technologies  
 21          that synthesize or manipulate content.

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

23          In this Act, the term “generative adversarial net-  
 24          work” means, with respect to artificial intelligence, the  
 25          machine learning process of attempting to cause a gener-

1 ator artificial neural network (referred to in this para-  
2 graph as the “generator” and a discriminator artificial  
3 neural network (referred to in this paragraph as a “dis-  
4 criminator”) to compete against each other to become  
5 more accurate in their function and outputs, through  
6 which the generator and discriminator create a feedback  
7 loop, causing the generator to produce increasingly higher-  
8 quality artificial outputs and the discriminator to increas-  
9 ingly improve in detecting such artificial outputs.

Passed the Senate November 18, 2020.

Attest:

*Secretary.*

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