

Calendar No. 198

117TH CONGRESS
1ST SESSION

S. 735

To amend the Scientific and Advanced-Technology Act of 1992 to further support advanced technological manufacturing, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MARCH 11, 2021

Mr. WICKER (for himself, Ms. CANTWELL, Ms. ROSEN, Ms. COLLINS, Mr. PETERS, and Mrs. BLACKBURN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

DECEMBER 16, 2021

Reported by Ms. CANTWELL, with an amendment

[Strike out all after the enacting clause and insert the part printed in *italic*]

A BILL

To amend the Scientific and Advanced-Technology Act of 1992 to further support advanced technological manufacturing, 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 “Advanced Techno-
5 logical Manufacturing Act”.

1 **SEC. 2. HARNESSING OUR NATION'S RESEARCH POTEN-**
 2 **TIAL.**

3 (a) **ESTABLISHMENT.**—The Director of the National
 4 Science Foundation shall conduct multiple pilot programs
 5 within the Foundation to expand the number of institu-
 6 tions of higher education (including such institutions that
 7 are community colleges); and other eligible entities that
 8 the Director determines appropriate, that are able to suc-
 9 cessfully compete for National Science Foundation grants.

10 (b) **COMPONENTS.**—Each pilot program described in
 11 subsection (a) shall include at least 1 of the following ele-
 12 ments:

13 (1) A mentorship program.

14 (2) Grant writing technical assistance.

15 (3) Targeted outreach.

16 (4) Programmatic support or solutions for insti-
 17 tutions or entities that do not have an experienced
 18 grant management office.

19 (5) An increase in the number of grant review-
 20 ers from institutions of higher education that have
 21 not traditionally received funds from the National
 22 Science Foundation.

23 (6) An increase of the term and funding, for a
 24 period of 3 years or less, as appropriate, to a prin-
 25 cipal investigator that is a first-time grant awardee,

1 when paired with regular mentoring on the adminis-
 2 trative aspects of grant management.

3 ~~(c) LIMITATION.—As appropriate, each pilot program~~
 4 ~~described in subsection (a) shall work to reduce adminis-~~
 5 ~~trative burdens.~~

6 ~~(d) AGENCY-WIDE PROGRAMS.—Not later than 5~~
 7 ~~years after the date of enactment of this Act, the Director~~
 8 ~~of the National Science Foundation shall—~~

9 (1) review the results of the pilot programs de-
 10 scribed in subsection (a); and

11 (2) develop agency-wide best practices from the
 12 pilot programs for implementation across the Foun-
 13 dation, in order to fulfill the requirement under sec-
 14 tion 3(e) of the National Science Foundation Act of
 15 1950 (42 U.S.C. 1862(e)).

16 ~~(e) INSTITUTION OF HIGHER EDUCATION.—In this~~
 17 ~~section, the term “institution of higher education” has the~~
 18 ~~meaning given the term in section 101 of the Higher Edu-~~
 19 ~~cation Act of 1965 (20 U.S.C. 1001).~~

20 **SEC. 3. ADVANCED SCIENTIFIC AND TECHNICAL MANUFAC-**
 21 **TURING.**

22 (a) ~~FINDINGS AND PURPOSE.—Section 2 of the Sci-~~
 23 ~~entific and Advanced-Technology Act of 1992 (42 U.S.C.~~
 24 ~~1862h) is amended—~~

25 (1) in subsection (a)—

1 (A) in paragraph (3), by striking “science,
2 mathematics, and technology” and inserting
3 “science, technology, engineering, and mathe-
4 matics or STEM”;

5 (B) in paragraph (4), by inserting “edu-
6 cated and” before “trained”; and

7 (C) in paragraph (5), by striking “sci-
8 entific and technical education and training”
9 and inserting “STEM education and training”;
10 and

11 (2) in subsection (b)—

12 (A) in paragraph (2), by striking “mathe-
13 matics and science” and inserting “STEM
14 fields”; and

15 (B) in paragraph (4), by striking “mathe-
16 matics and science instruction” and inserting
17 “STEM instruction”.

18 (b) ~~MODERNIZING REFERENCES TO STEM.~~—Section
19 3 of the Scientific and Advanced-Technology Act of 1992
20 (42 U.S.C. 1862i) is amended—

21 (1) in the section heading, by striking “**SCI-**
22 **ENTIFIC AND TECHNICAL EDUCATION**” and in-
23 serting “**STEM EDUCATION**”;

24 (2) in subsection (a)—

(A) in the subsection heading, by striking
 “SCIENTIFIC AND TECHNICAL EDUCATION”
 and inserting “STEM EDUCATION”;

(B) in the matter preceding paragraph
 (1)—

(i) by inserting “and education to pre-
 pare the skilled technical workforce to
 meet workforce demands” before “; and to
 improve”;

(ii) by striking “core education
 courses in science and mathematics” and
 inserting “core education courses in STEM
 fields”;

(iii) by inserting “veterans and indi-
 viduals engaged in” before “work in the
 home”; and

(iv) by inserting “and on building a
 pathway from secondary schools, to asso-
 ciate-degree-granting institutions, to ca-
 reers that require technical training” be-
 fore “; and shall be designed”;

(C) in paragraph (1)—

(i) by inserting “and study” after
 “development”; and

1 (ii) by striking “core science and
2 mathematics courses” and inserting “core
3 STEM courses”;

4 (D) in paragraph (2), by striking “science,
5 mathematics, and advanced-technology fields”
6 and inserting “STEM and advanced-technology
7 fields”;

8 (E) in paragraph (3)(A), by inserting “to
9 support the advanced-technology industries that
10 drive the competitiveness of the United States
11 in the global economy” before the semicolon at
12 the end;

13 (F) in paragraph (4), by striking “sci-
14 entific and advanced-technology fields” and in-
15 serting “STEM and advanced-technology
16 fields”; and

17 (G) in paragraph (5), by striking “ad-
18 vanced scientific and technical education” and
19 inserting “advanced STEM and advanced-tech-
20 nology”;

21 (3) in subsection (b)—

22 (A) by striking the subsection heading and
23 inserting the following: “CENTERS OF SCI-
24 ENTIFIC AND TECHNICAL EDUCATION.—”;

1 (B) in the matter preceding paragraph (1),
 2 by striking “not to exceed 10 in number” and
 3 inserting “in advanced-technology fields”;

4 (C) in paragraph (2), by striking “edu-
 5 cation in mathematics and science” and insert-
 6 ing “STEM education”; and

7 (D) in the flush matter following para-
 8 graph (2), by striking “in the geographic region
 9 served by the center”;

10 (4) in subsection (c)—

11 (A) in paragraph (1)—

12 (i) in subparagraph (A)—

13 (I) in the matter preceding clause
 14 (i), by striking “to encourage” and all
 15 that follows through “such means
 16 as—” and inserting “to encourage the
 17 development of career and educational
 18 pathways with multiple entry and exit
 19 points leading to credentials and de-
 20 grees, and to assist students pursuing
 21 pathways in STEM fields to transition
 22 from associate-degree-granting col-
 23 leges to bachelor-degree-granting in-
 24 stitutions, through such means as—”;

1 (II) in clause (i), by striking “to
 2 ensure” and inserting “to develop ar-
 3 ticulation agreements that ensure”;
 4 and

5 (III) in clause (ii), by striking
 6 “courses at the bachelor-degree-grant-
 7 ing institution” and inserting “the ca-
 8 reer and educational pathways sup-
 9 ported by the articulation agree-
 10 ments”;

11 (ii) in subparagraph (B)—

12 (I) in clause (i), by inserting
 13 “veterans and individuals engaged in”
 14 before “work in the home”;

15 (II) in clause (iii)—

16 (aa) by striking “bachelor’s-
 17 degree-granting institutions” and
 18 inserting “institutions or work
 19 sites”; and

20 (bb) by inserting “or indus-
 21 try internships” after “summer
 22 programs”; and

23 (III) by striking the flush text
 24 following clause (iv); and

25 (iii) by striking subparagraph (C);

1 (B) in paragraph (2)—

2 (i) by striking “mathematics and
3 science programs” and inserting “STEM
4 programs”;

5 (ii) by inserting “and, as appropriate,
6 elementary schools,” after “with secondary
7 schools”;

8 (iii) by striking “mathematics and
9 science education” and inserting “STEM
10 education”;

11 (iv) by striking “secondary school stu-
12 dents” and inserting “students at these
13 schools”;

14 (v) by striking “science and advanced-
15 technology fields” and inserting “STEM
16 and advanced-technology fields”; and

17 (vi) by striking “agreements with local
18 educational agencies” and inserting “ar-
19 ticulation agreements or dual credit
20 courses with local secondary schools, or
21 other means as the Director determines
22 appropriate,”; and

23 (C) in paragraph (3)—

24 (i) by striking subparagraph (B);

1 (ii) by striking “shall—” and all that
 2 follows through “establish a” and inserting
 3 “shall establish a”;

4 (iii) by striking “the fields of science,
 5 technology, engineering, and mathematics”
 6 and inserting “STEM fields”; and

7 (iv) by striking “; and” and inserting
 8 “; including jobs at Federal and academic
 9 laboratories.”;

10 (5) in subsection (d)(2)—

11 (A) in subparagraph (D), by striking
 12 “and” after the semicolon;

13 (B) in subparagraph (E), by striking the
 14 period at the end and inserting “; and”; and

15 (C) by adding at the end the following:

16 “(F) as appropriate, applications that
 17 apply the best practices for STEM education
 18 and technical skills education through distance
 19 learning or in a simulated work environment, as
 20 determined by research described in subsection
 21 (f).”;

22 (6) in subsection (g), by striking the second
 23 sentence;

24 (7) in subsection (h)(1)—

1 (A) in subparagraph (A), by striking
2 “2022” and inserting “2026”;

3 (B) in subparagraph (B), by striking
4 “2022” and inserting “2026”; and

5 (C) in subparagraph (C)—

6 (i) by striking “up to \$2,500,000”
7 and inserting “not less than \$3,000,000”;
8 and

9 (ii) by striking “2022” and inserting
10 “2026”; and

11 (8) in subsection (j)—

12 (A) by striking paragraph (1) and insert-
13 ing the following:

14 “(1) the term ‘advanced-technology’ includes
15 technological fields such as advanced manufacturing,
16 agricultural, biological and chemical technologies,
17 energy and environmental technologies, engineering
18 technologies, information technologies, micro and
19 nano-technologies, cybersecurity technologies,
20 geospatial technologies, and new, emerging tech-
21 nology areas;”;

22 (B) by striking paragraph (2) and insert-
23 ing the following:

24 “(2) the term ‘associate-degree-granting college’
25 means an institution of higher education (as defined

1 in section 102 of the Higher Education Act of 1965
 2 (20 U.S.C. 1002)) that offers a 2-year associate-de-
 3 gree program or 2-year certificate program;”;

4 (C) in paragraph (3), by striking “as de-
 5 termined under section 101 of the Higher Edu-
 6 cation Act of 1965” and inserting “as defined
 7 in section 102 of the Higher Education Act of
 8 1965 (20 U.S.C. 1002)”;

9 (D) in paragraph (4), by striking “sepa-
 10 rate bachelor-degree-granting institutions” and
 11 inserting “other entities”;

12 (E) by striking paragraph (7);

13 (F) by redesignating paragraphs (8) and
 14 (9) as paragraphs (7) and (8), respectively;

15 (G) in paragraph (7), as redesignated by
 16 subparagraph (F), by striking “and” after the
 17 semicolon;

18 (H) in paragraph (8), as redesignated by
 19 subparagraph (F)—

20 (i) by striking “mathematics, science,
 21 engineering, or technology” and inserting
 22 “science, technology, engineering, or math-
 23 ematics”; and

- 1 (ii) by striking “computer science.”
 2 and inserting “computer science and cyber-
 3 security; and”; and
 4 (I) by adding at the end the following:
 5 “(9) the term ‘skilled technical workforce’
 6 means workers—
 7 “(A) in occupations that use significant
 8 levels of science and engineering expertise and
 9 technical knowledge; and
 10 “(B) whose level of educational attainment
 11 is less than a bachelor degree.”.

12 **SECTION 1. HARNESSING OUR NATION’S RESEARCH POTEN-**
 13 **TIAL.**

14 (a) *ESTABLISHMENT.*—*The Director of the National*
 15 *Science Foundation shall conduct multiple pilot programs*
 16 *within the Foundation to expand the number of institutions*
 17 *of higher education (including such institutions that are*
 18 *community colleges), and other eligible entities that the Di-*
 19 *rector determines appropriate, that are able to successfully*
 20 *compete for National Science Foundation grants.*

21 (b) *COMPONENTS.*—*Each pilot program described in*
 22 *subsection (a) shall include at least 1 of the following ele-*
 23 *ments:*

- 24 (1) *A mentorship program.*
 25 (2) *Grant writing technical assistance.*

1 (3) *Targeted outreach, including to a minority-*
 2 *serving institution (including a historically Black col-*
 3 *lege or university, a Tribal College or University, or*
 4 *a Hispanic-serving institution) as described in any of*
 5 *paragraphs (1) through (7) of section 371(a) of the*
 6 *Higher Education Act of 1965 (20 U.S.C. 1067q(a)).*

7 (4) *Programmatic support or solutions for insti-*
 8 *tutions or entities that do not have an experienced*
 9 *grant management office.*

10 (5) *An increase in the number of grant reviewers*
 11 *from institutions of higher education that have not*
 12 *traditionally received funds from the National Science*
 13 *Foundation.*

14 (6) *An increase of the term and funding, for a*
 15 *period of 3 years or less, as appropriate, to a prin-*
 16 *cipal investigator that is a first-time grant awardee,*
 17 *when paired with regular mentoring on the adminis-*
 18 *trative aspects of grant management.*

19 (c) *LIMITATION.—As appropriate, each pilot program*
 20 *described in subsection (a) shall work to reduce administra-*
 21 *tive burdens.*

22 (d) *AGENCY-WIDE PROGRAMS.—Not later than 5 years*
 23 *after the date of enactment of this Act, the Director of the*
 24 *National Science Foundation shall—*

1 (1) *review the results of the pilot programs de-*
 2 *scribed in subsection (a); and*

3 (2) *develop agency-wide best practices from the*
 4 *pilot programs for implementation across the Foun-*
 5 *dation, in order to fulfill the requirement under sec-*
 6 *tion 3(e) of the National Science Foundation Act of*
 7 *1950 (42 U.S.C. 1862(e)).*

8 (e) *INSTITUTION OF HIGHER EDUCATION.—In this*
 9 *section, the term “institution of higher education” has the*
 10 *meaning given the term in section 101 of the Higher Edu-*
 11 *cation Act of 1965 (20 U.S.C. 1001).*

12 **SEC. 2. ADVANCED SCIENTIFIC AND TECHNICAL MANUFAC-**
 13 **TURING.**

14 (a) *FINDINGS AND PURPOSE.—Section 2 of the Sci-*
 15 *entific and Advanced-Technology Act of 1992 (42 U.S.C.*
 16 *1862h) is amended—*

17 (1) *in subsection (a)—*

18 (A) *in paragraph (3), by striking “science,*
 19 *mathematics, and technology” and inserting*
 20 *“science, technology, engineering, and mathe-*
 21 *matics or STEM”;*

22 (B) *in paragraph (4), by inserting “edu-*
 23 *cated and” before “trained”; and*

1 (C) in paragraph (5), by striking “scientific
2 and technical education and training” and in-
3 serting “STEM education and training”; and
4 (2) in subsection (b)—

5 (A) in paragraph (2), by striking “mathe-
6 matics and science” and inserting “STEM
7 fields”; and

8 (B) in paragraph (4), by striking “mathe-
9 matics and science instruction” and inserting
10 “STEM instruction”.

11 (b) *MODERNIZING REFERENCES TO STEM.*—Section
12 3 of the Scientific and Advanced-Technology Act of 1992
13 (42 U.S.C. 1862i) is amended—

14 (1) in the section heading, by striking “**SCI-**
15 **ENTIFIC AND TECHNICAL EDUCATION**” and in-
16 serting “**STEM EDUCATION**”;

17 (2) in subsection (a)—

18 (A) in the subsection heading, by striking
19 “**SCIENTIFIC AND TECHNICAL EDUCATION**” and
20 inserting “**STEM EDUCATION**”;

21 (B) in the matter preceding paragraph
22 (1)—

23 (i) by inserting “and education to pre-
24 pare the skilled technical workforce to meet

workforce demands” before “, and to improve”;

(ii) by striking “core education courses in science and mathematics” and inserting “core education courses in STEM fields”;

(iii) by inserting “veterans and individuals engaged in” before “work in the home”; and

(iv) by inserting “and on building a pathway from secondary schools, to associate-degree-granting institutions, to careers that require technical training” before “, and shall be designed”;

(C) in paragraph (1)—

(i) by inserting “and study” after “development”; and

(ii) by striking “core science and mathematics courses” and inserting “core STEM courses”;

(D) in paragraph (2), by striking “science, mathematics, and advanced-technology fields” and inserting “STEM and advanced-technology fields”;

(E) in paragraph (3)(A), by inserting “to support the advanced-technology industries that

drive the competitiveness of the United States in the global economy” before the semicolon at the end;

(F) in paragraph (4), by striking “scientific and advanced-technology fields” and inserting “STEM and advanced-technology fields”; and

(G) in paragraph (5), by striking “advanced scientific and technical education” and inserting “advanced STEM and advanced-technology”;

(3) in subsection (b)—

(A) by striking the subsection heading and inserting the following: “CENTERS OF SCIENTIFIC AND TECHNICAL EDUCATION.—”;

(B) in the matter preceding paragraph (1), by striking “not to exceed 12 in number” and inserting “in advanced-technology fields”;

(C) in paragraph (2), by striking “education in mathematics and science” and inserting “STEM education”; and

(D) in the flush matter following paragraph (2), by striking “in the geographic region served by the center”;

(4) in subsection (c)—

(A) in paragraph (1)—

1 *(i) in subparagraph (A)—*

2 *(I) in the matter preceding clause*
 3 *(i), by striking “to encourage” and all*
 4 *that follows through “such means as—*
 5 *” and inserting “to encourage the de-*
 6 *velopment of career and educational*
 7 *pathways with multiple entry and exit*
 8 *points leading to credentials and de-*
 9 *grees, and to assist students pursuing*
 10 *pathways in STEM fields to transition*
 11 *from associate-degree-granting colleges*
 12 *to bachelor-degree-granting institu-*
 13 *tions, through such means as—”;*

14 *(II) in clause (i), by striking “to*
 15 *ensure” and inserting “to develop ar-*
 16 *ticulation agreements that ensure”;*
 17 *and*

18 *(III) in clause (ii), by striking*
 19 *“courses at the bachelor-degree-grant-*
 20 *ing institution” and inserting “the ca-*
 21 *reer and educational pathways sup-*
 22 *ported by the articulation agreements”;*
 23 *(ii) in subparagraph (B)—*

1 (I) in clause (i), by inserting
2 “veterans and individuals engaged in”
3 before “work in the home”;

4 (II) in clause (iii)—

5 (aa) by striking “bachelor’s-
6 degree-granting institutions” and
7 inserting “institutions or work
8 sites”; and

9 (bb) by inserting “or indus-
10 try internships” after “summer
11 programs”; and

12 (III) by striking the flush text fol-
13 lowing clause (iv); and

14 (iii) by striking subparagraph (C);

15 (B) in paragraph (2)—

16 (i) by striking “mathematics and
17 science programs” and inserting “STEM
18 programs”;

19 (ii) by inserting “and, as appropriate,
20 elementary schools,” after “with secondary
21 schools”;

22 (iii) by striking “mathematics and
23 science education” and inserting “STEM
24 education”;

1 (iv) by striking “secondary school stu-
2 dents” and inserting “students at these
3 schools”;

4 (v) by striking “science and advanced-
5 technology fields” and inserting “STEM
6 and advanced-technology fields”; and

7 (vi) by striking “agreements with local
8 educational agencies” and inserting “ar-
9 ticulation agreements or dual credit courses
10 with local secondary schools, or other means
11 as the Director determines appropriate,”;
12 and

13 (C) in paragraph (3)—

14 (i) by striking subparagraph (B);

15 (ii) by striking “shall—” and all that
16 follows through “establish a” and inserting
17 “shall establish a”;

18 (iii) by striking “the fields of science,
19 technology, engineering, and mathematics”
20 and inserting “STEM fields”; and

21 (iv) by striking “; and” and inserting
22 “, including jobs at Federal and academic
23 laboratories.”;

24 (5) in subsection (d)(2)—

1 (A) in subparagraph (D), by striking “and”
2 after the semicolon;

3 (B) in subparagraph (E), by striking the
4 period at the end and inserting “; and”; and

5 (C) by adding at the end the following:

6 “(F) as appropriate, applications that
7 apply the best practices for STEM education and
8 technical skills education through distance learn-
9 ing or in a simulated work environment, as de-
10 termined by research described in subsection
11 (f).”;

12 (6) in subsection (g), by striking the second sen-
13 tence;

14 (7) in subsection (h)(1)—

15 (A) in subparagraph (A), by striking
16 “2022” and inserting “2026”;

17 (B) in subparagraph (B), by striking
18 “2022” and inserting “2026”; and

19 (C) in subparagraph (C)—

20 (i) by striking “up to \$2,500,000” and
21 inserting “not less than \$3,000,000”; and

22 (ii) by striking “2022” and inserting
23 “2026”; and

24 (8) in subsection (j)—

1 (A) by striking paragraph (1) and inserting
2 the following:

3 “(1) the term ‘advanced-technology’ includes
4 technological fields such as advanced manufacturing,
5 agricultural-, biological- and chemical-technologies,
6 energy and environmental technologies, engineering
7 technologies, information technologies, micro and
8 nano-technologies, cybersecurity technologies,
9 geospatial technologies, and new, emerging technology
10 areas;”;

11 (B) by striking paragraph (2) and inserting
12 the following:

13 “(2) the term ‘associate-degree-granting college’
14 means an institution of higher education (as defined
15 in section 102 of the Higher Education Act of 1965
16 (20 U.S.C. 1002)) that offers a 2-year associate-degree
17 program or 2-year certificate program;”;

18 (C) in paragraph (3), by striking “as deter-
19 mined under section 101 of the Higher Edu-
20 cation Act of 1965” and inserting “as defined in
21 section 102 of the Higher Education Act of 1965
22 (20 U.S.C. 1002)”;

23 (D) in paragraph (4), by striking “separate
24 bachelor-degree-granting institutions” and in-
25 serting “other entities”;

1 (E) by striking paragraph (7);

2 (F) by redesignating paragraphs (8) and
3 (9) as paragraphs (7) and (8), respectively;

4 (G) in paragraph (7), as redesignated by
5 subparagraph (F), by striking “and” after the
6 semicolon;

7 (H) in paragraph (8), as redesignated by
8 subparagraph (F)—

9 (i) by striking “mathematics, science,
10 engineering, or technology” and inserting
11 “science, technology, engineering, or mathe-
12 matics”; and

13 (ii) by striking “computer science and
14 cybersecurity.” and inserting “computer
15 science and cybersecurity; and”; and

16 (I) by adding at the end the following:

17 “(9) the term ‘skilled technical workforce’ means
18 workers—

19 “(A) in occupations that use significant lev-
20 els of science and engineering expertise and tech-
21 nical knowledge; and

22 “(B) whose level of educational attainment
23 is less than a bachelor degree.”.

1 (c) *AUTHORIZATION OF APPROPRIATIONS.*—Section 5
2 *of the Scientific and Advanced-Technology Act of 1992 (42*
3 *U.S.C. 1862j) is amended to read as follows:*

4 **“SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

5 *“There are authorized to be appropriated, from sums*
6 *otherwise authorized to be appropriated, to the Director for*
7 *carrying out this Act, \$150,000,000 for each of fiscal years*
8 *2022 through 2027.”.*

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A BILL

To amend the Scientific and Advanced-Technology
Act of 1992 to further support advanced techno-
logical manufacturing, and for other purposes.

DECEMBER 16, 2021
Reported with an amendment