

116TH CONGRESS
1ST SESSION

H. R. 4979

To direct the Director of the National Science Foundation to support STEM education and workforce development research focused on rural areas, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

NOVEMBER 5, 2019

Mr. LUCAS (for himself, Mr. MCADAMS, Mr. BAIRD, Ms. JOHNSON of Texas, Mr. CONAWAY, Ms. KENDRA S. HORN of Oklahoma, Mr. WEBER of Texas, Mr. BALDERSON, Mr. NORMAN, Mr. MURPHY of North Carolina, Mr. COMER, Mr. GONZALEZ of Ohio, and Mr. WALTZ) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

A BILL

To direct the Director of the National Science Foundation to support STEM education and workforce development research focused on rural areas, 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 “Rural STEM Edu-
5 cation Act”.

6 **SEC. 2. FINDINGS.**

7 Congress finds the following:

1 (1) The supply of STEM workers is not keeping
2 pace with the rapidly evolving needs of the public
3 and private sector, resulting in a deficit often re-
4 ferred to as a STEM skills shortage.

5 (2) According to the Bureau of Labor Statis-
6 tics, the United States will need one million addi-
7 tional STEM professionals than it is on track to
8 produce in the coming decade.

9 (3) Many STEM occupations offer higher
10 wages, more opportunities for advancement, and a
11 higher degree of job security than non-STEM jobs.

12 (4) The 60,000,000 individuals in the United
13 States who live in rural settings are significantly
14 under-represented in STEM.

15 (5) According to the National Center for Edu-
16 cation Statistics, nine million students in the United
17 States—nearly 20 percent of the total K–12 popu-
18 lation—attend rural schools, and for reasons rang-
19 ing from teacher quality to shortages of resources,
20 these students often have fewer opportunities for
21 high-quality STEM learning than their peers in the
22 Nation’s urban and suburban schools.

23 (6) Rural areas represent one of the most
24 promising, yet underutilized, opportunities for

1 STEM education to impact workforce development
2 and regional innovation, including agriculture.

3 (7) The study of agriculture, food, and natural
4 resources involves biology, engineering, physics,
5 chemistry, math, geology, and other scientific fields.

6 (8) More than 293,000,000 individuals in the
7 United States use high-speed broadband to work,
8 learn, access healthcare, and operate their busi-
9 nesses, while 19,000,000 individuals in the United
10 States still lack access to high-speed broadband.
11 Rural areas are hardest hit, with over 26 percent of
12 individuals in rural areas in the United States lack-
13 ing access to high-speed broadband compared to 1.7
14 percent of individuals in urban areas in the United
15 States.

16 **SEC. 3. NATIONAL SCIENCE FOUNDATION RURAL STEM AC-**
17 **TIVITIES.**

18 (a) PREPARING RURAL STEM EDUCATORS.—

19 (1) IN GENERAL.—The Director shall provide
20 grants on a merit-reviewed, competitive basis to in-
21 stitutions of higher education or nonprofit organiza-
22 tions (or a consortium thereof) for research and de-
23 velopment to advance innovative approaches to sup-
24 port and sustain high-quality STEM teaching in
25 rural schools.

1 (2) USE OF FUNDS.—

2 (A) IN GENERAL.—Grants awarded under
3 this section shall be used for the research and
4 development activities referred to in paragraph
5 (1), which may include—

6 (i) engaging rural educators of stu-
7 dents in grades Pre-K through 12 in pro-
8 fessional learning opportunities to enhance
9 STEM knowledge, including computer
10 science, and develop best practices;

11 (ii) supporting research on effective
12 STEM teaching practices in rural settings,
13 including the use of rubrics and mastery-
14 based grading practices to assess student
15 performance when employing the transdis-
16 ciplinary teaching approach for STEM dis-
17 ciplines;

18 (iii) designing and developing pre-
19 service and in-service training resources to
20 assist such rural educators in adopting
21 transdisciplinary teaching practices across
22 STEM courses;

23 (iv) coordinating with local partners
24 to adapt STEM teaching practices to lever-
25 age local natural and community assets in

1 order to support in-place learning in rural
2 areas;

3 (v) providing hands-on training and
4 research opportunities for rural educators
5 described in clause (i) at Federal Labora-
6 tories, institutions of higher education, or
7 in industry;

8 (vi) developing training and best prac-
9 tices for educators who teach multiple
10 grade levels within a STEM discipline;

11 (vii) designing and implementing pro-
12 fessional development courses and experi-
13 ences, including mentoring, for rural edu-
14 cators described in clause (i) that combine
15 face-to-face and online experiences; and

16 (viii) any other activity the Director
17 determines will accomplish the goals of this
18 subsection.

19 (B) RURAL STEM COLLABORATIVE.—The
20 Director may establish a pilot program of re-
21 gional cohorts in rural areas that will provide
22 peer support, mentoring, and hands-on research
23 experiences for rural STEM educators of stu-
24 dents in grades Pre-K through 12, in order to
25 build an ecosystem of cooperation among edu-

1 cators, researchers, academia, and local indus-
2 try.

3 (b) BROADENING PARTICIPATION OF RURAL STU-
4 DENTS IN STEM.—

5 (1) IN GENERAL.—The Director shall provide
6 grants on a merit-reviewed, competitive basis to in-
7 stitutions of higher education or nonprofit organiza-
8 tions (or a consortium thereof) for—

9 (A) research and development of program-
10 ming to identify the barriers rural students face
11 in accessing high-quality STEM education; and

12 (B) development of innovative solutions to
13 improve the participation and advancement of
14 rural students in grades Pre–K through 12 in
15 STEM studies.

16 (2) USE OF FUNDS.—

17 (A) IN GENERAL.—Grants awarded under
18 this section shall be used for the research and
19 development activities referred to in paragraph
20 (1), which may include—

21 (i) developing partnerships with com-
22 munity colleges to offer advanced STEM
23 course work to rural high school students;

24 (ii) supporting research on effective
25 STEM practices in rural settings;

- 1 (iii) implementing a school-wide
2 STEM approach;
- 3 (iv) improving the National Science
4 Foundation's Advanced Technology Edu-
5 cation program's coordination and engage-
6 ment with rural communities;
- 7 (v) collaborating with existing commu-
8 nity partners and networks, such as the co-
9 operative research and extension services
10 of the Department of Agriculture and
11 youth serving organizations like 4-H, after
12 school STEM programs, and summer
13 STEM programs, to leverage community
14 resources and develop place-based pro-
15 gramming;
- 16 (vi) connecting rural school districts
17 and institutions of higher education, to im-
18 prove precollegiate STEM education and
19 engagement;
- 20 (vii) supporting partnerships that
21 offer hands-on inquiry-based science activi-
22 ties and access to lab resources for stu-
23 dents studying STEM in grades Pre-K
24 through 12 in a rural area;

1 (viii) evaluating the role of broadband
2 connectivity and its associated impact on
3 the STEM and technology literacy of rural
4 students;

5 (ix) building capacity to support ex-
6 tracurricular STEM programs in rural
7 schools, including mentor-led engagement
8 programs, STEM programs held during
9 nonschool hours, STEM networks, maker-
10 spaces, and competitions; and

11 (x) any other activity the Director de-
12 termines will accomplish the goals of this
13 subsection.

14 (c) APPLICATION.—An applicant seeking a grant
15 under subsection (a) or (b) shall submit an application at
16 such time, in such manner, and containing such informa-
17 tion as the Director may require. The application may in-
18 clude the following:

19 (1) A description of the target population to be
20 served by the research activity or activities for which
21 such grant is sought.

22 (2) A description of the process for recruitment
23 and selection of students, educators, or schools from
24 rural areas to participate in such activity or activi-
25 ties.

1 (3) A description of how such activity or activi-
2 ties may inform efforts to promote rural students in
3 grades Pre–K through 12 engagement and achieve-
4 ment in STEM studies.

5 (4) In the case of a proposal consisting of a
6 partnership or partnerships with one or more rural
7 schools and one or more researchers, a plan for es-
8 tablishing a sustained partnership that is jointly de-
9 veloped and managed, draws from the capacities of
10 each partner, and is mutually beneficial.

11 (d) PARTNERSHIPS.—In awarding grants under sub-
12 section (a) or (b), the Director shall—

13 (1) encourage applicants which, for the purpose
14 of the activity or activities funded through the grant,
15 include or partner with a nonprofit organization or
16 an institution of higher education (or a consortium
17 thereof) that has extensive experience and expertise
18 in increasing the participation of students in grades
19 Pre–K through 12 in STEM;

20 (2) encourage applicants which, for the purpose
21 of the activity or activities funded through the grant,
22 include or partner with a consortium of rural schools
23 or rural school districts; and

24 (3) encourage applications which, for the pur-
25 pose of the activity or activities funded through the

1 grant, include commitments from school principals
2 and administrators to making reforms and activities
3 proposed by the applicant a priority.

4 (e) EVALUATIONS.—All proposals for grants under
5 subsections (a) and (b) shall include an evaluation plan
6 that includes the use of outcome oriented measures to as-
7 sess the impact and efficacy of the grant. Each recipient
8 of a grant under this section shall include results from
9 these evaluative activities in annual and final projects.

10 (f) ACCOUNTABILITY AND DISSEMINATION.—

11 (1) EVALUATION REQUIRED.—The Director
12 shall evaluate the portfolio of grants awarded under
13 subsections (a) and (b). Such evaluation shall—

14 (A) use a common set of benchmarks and
15 tools to assess the results of research conducted
16 under such grants and identify best practices;
17 and

18 (B) to the extent practicable, integrate the
19 findings of research resulting from the activity
20 or activities funded through such grants with
21 the findings of other research on rural student's
22 pursuit of degrees or careers in STEM.

23 (2) REPORT ON EVALUATIONS.—Not later than
24 180 days after the completion of the evaluation
25 under paragraph (1), the Director shall submit to

1 Congress and make widely available to the public a
2 report that includes—

3 (A) the results of the evaluation; and

4 (B) any recommendations for administra-
5 tive and legislative action that could optimize
6 the effectiveness of the grants awarded under
7 this section.

8 (g) REPORT BY COMMITTEE ON EQUAL OPPORTUNI-
9 TIES IN SCIENCE AND ENGINEERING.—

10 (1) IN GENERAL.—As part of the first report
11 required by section 36(e) of the Science and Engi-
12 neering Equal Opportunities Act (42 U.S.C.
13 1885c(e)) transmitted to Congress after the date of
14 enactment of this Act, the Committee on Equal Op-
15 portunities in Science and Engineering shall in-
16 clude—

17 (A) a description of past and present poli-
18 cies and activities of the Foundation to encour-
19 age full participation of students in rural com-
20 munities in science, mathematics, engineering,
21 and computer science fields; and

22 (B) an assessment of trends in participa-
23 tion of rural students in grades Pre–K through
24 12 in Foundation activities, and an assessment
25 of the policies and activities of the Foundation,

1 along with proposals for new strategies or the
2 broadening of existing successful strategies to-
3 wards facilitating the goals of this Act.

4 (2) TECHNICAL CORRECTION.—

5 (A) IN GENERAL.—Section 313 of the
6 American Innovation and Competitiveness Act
7 (Public Law 114–329) is amended by striking
8 “Section 204(e) of the National Science Foun-
9 dation Authorization Act of 1988” and insert-
10 ing “Section 36(e) of the Science and Engineer-
11 ing Equal Opportunities Act”.

12 (B) APPLICABILITY.—The amendment
13 made by paragraph (1) shall take effect as if
14 included in the enactment of section 313 of the
15 American Innovation and Competitiveness Act
16 (Public Law 114–329).

17 (h) COORDINATION.—In carrying out this section, the
18 Director shall, for purposes of enhancing program effec-
19 tiveness and avoiding duplication of activities, consult, co-
20 operate, and coordinate with the programs and policies of
21 other relevant Federal agencies.

22 (i) AUTHORIZATION OF APPROPRIATIONS.—There
23 are authorized to be appropriated to the Director—

1 (1) \$8,000,000 to carry out the activities under
2 subsection (a) for each of fiscal years 2020 through
3 2025; and

4 (2) \$12,000,000 to carry out the activities
5 under subsection (b) for each of fiscal years 2020
6 through 2025.

7 **SEC. 4. OPPORTUNITIES FOR ONLINE EDUCATION.**

8 (a) **IN GENERAL.**—The Director shall award competi-
9 tive grants to institutions of higher education or nonprofit
10 organizations (or a consortium thereof, which may include
11 a private sector partner) to conduct research on online
12 STEM education courses for rural communities.

13 (b) **RESEARCH AREAS.**—The research areas eligible
14 for funding under this subsection shall include—

15 (1) evaluating the learning and achievement of
16 rural students in grades Pre–K through 12 in
17 STEM subjects;

18 (2) understanding how computer-based and on-
19 line professional development courses and mentor ex-
20 periences can be integrated to meet the needs of
21 educators of rural students in grades Pre–K through
22 12;

23 (3) combining computer-based and online
24 STEM education and training with apprenticeships,
25 mentoring, or other applied learning arrangements;

1 (4) leveraging online programs to supplement
2 STEM studies for rural students that need physical
3 and academic accommodation; and

4 (5) any other activity the Director determines
5 will accomplish the goals of this subsection.

6 (c) EVALUATIONS.—All proposals for grants under
7 this section shall include an evaluation plan that includes
8 the use of outcome oriented measures to assess the impact
9 and efficacy of the grant. Each recipient of a grant under
10 this section shall include results from these evaluative ac-
11 tivities in annual and final projects.

12 (d) ACCOUNTABILITY AND DISSEMINATION.—

13 (1) EVALUATION REQUIRED.—The Director
14 shall evaluate the portfolio of grants awarded under
15 this section. Such evaluation shall—

16 (A) use a common set of benchmarks and
17 tools to assess the results of research conducted
18 under such grants and identify best practices;
19 and

20 (B) to the extent practicable, integrate
21 findings from activities carried out pursuant to
22 research conducted under this section, with re-
23 spect to the pursuit of careers and degrees in
24 STEM, with those activities carried our pursu-

1 ant to other research on serving rural students
2 and communities.

3 (2) REPORT ON EVALUATIONS.—Not later than
4 180 days after the completion of the evaluation
5 under paragraph (1), the Director shall submit to
6 Congress and make widely available to the public a
7 report that includes—

8 (A) the results of the evaluation; and

9 (B) any recommendations for administra-
10 tive and legislative action that could optimize
11 the effectiveness of the grants awarded under
12 this section.

13 (e) COORDINATION.—In carrying out this section, the
14 Director shall, for purposes of enhancing program effec-
15 tiveness and avoiding duplication of activities, consult, co-
16 operate, and coordinate with the programs and policies of
17 other relevant Federal agencies.

18 **SEC. 5. NATIONAL ACADEMY OF SCIENCES EVALUATION.**

19 (a) STUDY.—Not later than 12 months after the date
20 of enactment of this Act, the Director shall enter into an
21 agreement with the National Academy of Sciences under
22 which the National Academy agrees to conduct an evalua-
23 tion and assessment that—

24 (1) evaluates the quality and quantity of cur-
25 rent Federal programming and research directed at

1 examining STEM education for students in grades
2 Pre–K through 12 and workforce development in
3 rural areas;

4 (2) assesses the impact of the scarcity of
5 broadband connectivity in rural communities has on
6 STEM and technical literacy for students in grades
7 Pre–K through 12 in rural areas; and

8 (3) assesses the core research and data needed
9 to understand the challenges rural areas are facing
10 in providing quality STEM education and workforce
11 development; and

12 (4) makes recommendations for improving
13 STEM education for students in grades Pre–K
14 through 12 and workforce development in rural
15 areas.

16 (b) REPORT TO DIRECTOR.—The agreement entered
17 into under subsection (a) shall require the National Acad-
18 emy of Sciences, not later than 24 months after the date
19 of enactment of this Act, to submit to the Director a re-
20 port on the study conducted under such subsection, includ-
21 ing the National Academy’s findings and recommenda-
22 tions.

23 (c) AUTHORIZATION OF APPROPRIATIONS.—There
24 are authorized to be appropriated to the Director to carry
25 out this section \$1,000,000 for fiscal year 2020.

1 **SEC. 6. CAPACITY BUILDING THROUGH EPSCOR.**

2 Section 517(f)(2) of the America COMPETES Reau-
3 thorization Act of 2010 (42 U.S.C. 1862p-9(f)(2)) is
4 amended—

5 (1) in subparagraph (A), by striking “and” at
6 the end; and

7 (2) by adding at the end the following:

8 “(C) to increase the capacity of rural com-
9 munities to provide quality STEM education
10 and STEM workforce development program-
11 ming to students, and teachers; and”.

12 **SEC. 7. NIST ENGAGEMENT WITH RURAL COMMUNITIES.**

13 (a) MEP OUTREACH.—Section 25 of the National
14 Institute of Standards and Technology Act (15 U.S.C.
15 278k) is amended—

16 (1) in subsection (c)—

17 (A) in paragraph (6), by striking “commu-
18 nity colleges and area career and technical edu-
19 cation schools” and inserting the following:
20 “secondary schools (as defined in section 8101
21 of the Elementary and Secondary Education
22 Act of 1965 (20 U.S.C. 7801)), community col-
23 leges, and area career and technical education
24 schools, including those in underserved and
25 rural communities,”; and

26 (B) in paragraph (7)—

1 (i) by striking “and local colleges”
2 and inserting the following: “local high
3 schools and local colleges, including those
4 in underserved and rural communities,”;
5 and

6 (ii) by inserting “or other applied
7 learning opportunities” after “apprentice-
8 ships”; and

9 (2) in subsection (d)(3) by striking “, commu-
10 nity colleges, and area career and technical edu-
11 cation schools,” and inserting the following: “and
12 local high schools, community colleges, and area ca-
13 reer and technical education schools, including those
14 in underserved and rural communities,”.

15 (b) RURAL CONNECTIVITY PRIZE COMPETITION.—

16 (1) PRIZE COMPETITION.—Pursuant to section
17 24 of the Stevenson-Wydler Technology Innovation
18 Act of 1980 (15 U.S.C. 3719), the Secretary of
19 Commerce, acting through the Under Secretary of
20 Commerce for Standards and Technology (referred
21 to in this subsection as the “Secretary”), shall carry
22 out a program to award prizes competitively to stim-
23 ulate research and development of creative tech-
24 nologies in order to deploy affordable and reliable

1 broadband connectivity to underserved rural commu-
2 nities.

3 (2) PLAN FOR DEPLOYMENT IN RURAL COMMU-
4 NITIES.—Each proposal submitted pursuant to para-
5 graph (1) shall include a plan for deployment of the
6 technology that is the subject of such proposal in an
7 underserved rural community.

8 (3) PRIZE AMOUNT.—In carrying out the pro-
9 gram under paragraph (1), the Secretary may award
10 not more than a total of \$5,000,000 to one or more
11 winners of the prize competition.

12 (4) REPORT.—Not later than 60 days after the
13 date on which a prize is awarded under the prize
14 competition, the Secretary shall submit to the rel-
15 evant committees of Congress a report that describes
16 the winning proposal of the prize competition.

17 (5) CONSULTATION.—In carrying out the pro-
18 gram under subsection (a), the Secretary may con-
19 sult with the heads of relevant departments and
20 agencies of the Federal Government.

21 **SEC. 8. NITR-D BROADBAND WORKING GROUP.**

22 Title I of the High-Performance Computing Act of
23 1991 (15 U.S.C. 5511 et seq.) is amended by adding at
24 the end the following:

1 **“SEC. 103. BROADBAND RESEARCH AND DEVELOPMENT**
2 **WORKING GROUP.**

3 “(a) **IN GENERAL.**—The Director shall establish a
4 broadband research and development working group to ad-
5 dress national research challenges and opportunities for
6 improving broadband access and adoption across the
7 United States.

8 “(b) **ACTIVITIES.**—The working group shall identify
9 and coordinate key priorities for addressing broadband ac-
10 cess and adoption, including—

11 “(1) promising research areas;

12 “(2) requirements for data collection and shar-
13 ing;

14 “(3) opportunities for better alignment and co-
15 ordination across Federal agencies and external
16 stakeholders; and

17 “(4) potential development of new Federal poli-
18 cies and programs.

19 “(c) **COORDINATION.**—The working group shall co-
20 ordinate, as appropriate, with the Rural Broadband Inte-
21 gration Working Group established under section 6214 of
22 the Agriculture Improvement Act of 2018 (Public Law
23 115–334) and the National Institute of Food and Agri-
24 culture of the Department of Agriculture.

1 “(d) REPORT.—The working group shall report to
2 Congress on their activities as part of the annual report
3 submitted under section 101(a)(2)(D).

4 “(e) SUNSET.—The authority to carry out this sec-
5 tion shall terminate on the date that is 5 years after the
6 date of enactment of the Rural STEM Education Act.”.

7 **SEC. 9. DEFINITIONS.**

8 In this Act:

9 (1) DIRECTOR.—The term “Director” means
10 the Director of the National Science Foundation es-
11 tablished under section 2 of the National Science
12 Foundation Act of 1950 (42 U.S.C. 1861).

13 (2) FEDERAL LABORATORY.—The term “Fed-
14 eral laboratory” has the meaning given such term in
15 section 4 of the Stevenson-Wydler Technology Inno-
16 vation Act of 1980 (15 U.S.C. 3703).

17 (3) FOUNDATION.—The term “Foundation”
18 means the National Science Foundation established
19 under section 2 of the National Science Foundation
20 Act of 1950 (42 U.S.C. 1861).

21 (4) INSTITUTION OF HIGHER EDUCATION.—The
22 term “institution of higher education” has the
23 meaning given such term in section 101(a) of the
24 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

1 (5) STEM.—The term “STEM” has the mean-
2 ing given the term in section 2 of the America COM-
3 PETES Reauthorization Act of 2010 (42 U.S.C.
4 6621 note).

5 (6) STEM EDUCATION.—The term “STEM
6 education” has the meaning given the term in sec-
7 tion 2 of the STEM Education Act of 2015 (42
8 U.S.C. 6621 note).

○