116TH CONGRESS
2D SESSION

# S. _____

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.

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IN THE SENATE OF THE UNITED STATES

_____ (legislative day, _____), _____

Mr. WICKER (for himself and Ms. ROSEN) introduced the following bill; which was read twice and referred to the Committee on _____

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# 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.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the ''Rural STEM Education Act''.

**SEC. 2. FINDINGS.**

Congress finds the following:

(1) The supply of STEM workers is not keeping pace with the rapidly evolving needs of the public

and private sector, resulting in a deficit often referred to as a STEM skills shortage.

(2) According to the Bureau of Labor Statistics, the United States will need 1,000,000 more STEM professionals than the United States is on track to produce in the coming decade.

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

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

(5) According to the National Center for Education Statistics, 9,000,000 students in the United States, an amount equal to nearly 20 percent of the total population of students in kindergarten through grade 12, attend rural schools, and for reasons ranging from teacher quality to shortages of resources, these students often have fewer opportunities for high-quality STEM learning than their peers in the Nation's urban and suburban schools.

(6) Rural areas represent one of the most promising, yet underutilized, opportunities for STEM education to impact workforce development and regional innovation, including agriculture.

(7) The study of agriculture, food, and natural resources involves biology, engineering, physics, chemistry, mathematics, geology, computer science, and other scientific fields.

(8) It is estimated that by 2020 that there will be a projected 1,000,000 more computing jobs than applicants who can fill them. To meet this demand, rural students must acquire computing skills through exposure to computer science learning in prekindergarten through grade 12 and in informal learning settings.

(9) More than 293,000,000 individuals in the United States use high-speed broadband to work, learn, access healthcare, and operate their businesses, while 19,000,000 individuals in the United States still lack access to high-speed broadband. Rural areas are hardest hit, with over 26 percent of individuals in rural areas in the United States lacking access to high-speed broadband compared to 1.7 percent of individuals in urban areas in the United States.

**SEC. 3. NATIONAL SCIENCE FOUNDATION RURAL STEM ACTIVITIES.**

(a) PREPARING RURAL STEM EDUCATORS.—

(1) IN GENERAL.—The Director shall provide grants on a merit-reviewed, competitive basis to institutions of higher education or nonprofit organizations (or a consortium thereof) for research and development to advance innovative approaches to support and sustain high-quality STEM teaching in rural schools.

(2) USE OF FUNDS.—

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

(i) engaging rural educators of students in prekindergarten through grade 12 in professional learning opportunities to enhance STEM knowledge, including computer science, and develop best practices;

(ii) supporting research on effective STEM teaching practices in rural settings, including the use of rubrics and mastery-based grading practices to assess student performance when employing the transdisciplinary teaching approach for STEM disciplines;

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

(iv) coordinating with local partners to adapt STEM teaching practices to leverage local natural and community assets in order to support in-place learning in rural areas;

(v) providing hands-on training and research opportunities for rural educators described in clause (i) at Federal Laboratories, institutions of higher education, or in industry;

(vi) developing training and best practices for educators who teach multiple grade levels within a STEM discipline;

(vii) designing and implementing professional development courses and experiences, including mentoring, for rural educators described in clause (i) that combine face-to-face and online experiences; and

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

(B) RURAL STEM COLLABORATIVE.—The Director shall establish a pilot program of regional cohorts in rural areas that will provide peer support, mentoring, and hands-on research experiences for rural STEM educators of students in prekindergarten through grade 12, in order to build an ecosystem of cooperation among educators, researchers, academia, and local industry.

(b) BROADENING PARTICIPATION OF RURAL STUDENTS IN STEM.—

(1) IN GENERAL.—The Director shall provide grants on a merit-reviewed, competitive basis to institutions of higher education or nonprofit organizations (or a consortium thereof) for—

(A) research and development of programming to identify the barriers rural students face in accessing high-quality STEM education; and

(B) development of innovative solutions to improve the participation and advancement of rural students in prekindergarten through grade 12 in STEM studies.

(2) USE OF FUNDS.—

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

(i) developing partnerships with community colleges to offer advanced STEM course work, including computer science, to rural high school students;

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

(iii) implementing a school-wide STEM approach;

(iv) improving the National Science Foundation's Advanced Technology Education program's coordination and engagement with rural communities;

(v) collaborating with existing community partners and networks, such as the Cooperative Extension System services and extramural research programs of the Department of Agriculture and youth serving organizations like 4-H, after school STEM programs, and summer STEM programs,

to leverage community resources and develop place-based programming;

(vi) connecting rural school districts and institutions of higher education, to improve precollegiate STEM education and engagement;

(vii) supporting partnerships that offer hands-on inquiry-based science activities, including coding, and access to lab resources for students studying STEM in prekindergarten through grade 12 in a rural area;

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

(ix) building capacity to support extracurricular STEM programs in rural schools, including mentor-led engagement programs, STEM programs held during nonschool hours, STEM networks, makerspaces, coding activities, and competitions; and

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

(c) APPLICATION.—An applicant seeking a grant under subsection (a) or (b) shall submit an application at such time, in such manner, and containing such information as the Director may require. The application may include the following:

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

(2) A description of the process for recruitment and selection of students, educators, or schools from rural areas to participate in such activity or activities.

(3) A description of how such activity or activities may inform efforts to promote the engagement and achievement of rural students in prekindergarten through grade 12 in STEM studies.

(4) In the case of a proposal consisting of a partnership or partnerships with one or more rural schools and one or more researchers, a plan for establishing a sustained partnership that is jointly developed and managed, draws from the capacities of each partner, and is mutually beneficial.

(d) PARTNERSHIPS.—In awarding grants under subsection (a) or (b), the Director shall—

(1) encourage applicants which, for the purpose of the activity or activities funded through the grant, include or partner with a nonprofit organization or an institution of higher education (or a consortium thereof) that has extensive experience and expertise in increasing the participation of rural students in prekindergarten through grade 12 in STEM;

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

(3) encourage applications which, for the purpose of the activity or activities funded through the grant, include commitments from school principals and administrators to making reforms and activities proposed by the applicant a priority.

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

(f) ACCOUNTABILITY AND DISSEMINATION.—

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

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

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

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

(A) the results of the evaluation; and

(B) any recommendations for administrative and legislative action that could optimize the effectiveness of the grants awarded under this section.

(g) REPORT BY COMMITTEE ON EQUAL OPPORTUNITIES IN SCIENCE AND ENGINEERING.—

(1) IN GENERAL.—As part of the first report required by section 36(e) of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885c(e)) transmitted to Congress after the date of enactment of this Act, the Committee on Equal Opportunities in Science and Engineering shall include—

(A) a description of past and present policies and activities of the Foundation to encourage full participation of students in rural communities in science, mathematics, engineering, and computer science fields; and

(B) an assessment of trends in participation of rural students in prekindergarten through grade 12 in Foundation activities, and an assessment of the policies and activities of the Foundation, along with proposals for new strategies or the broadening of existing successful strategies towards facilitating the goals of this Act.

(2) TECHNICAL CORRECTION.—

(A) IN GENERAL.—Section 313 of the American Innovation and Competitiveness Act (Public Law 114–329) is amended by striking ''Section 204(e) of the National Science Foun-

dation Authorization Act of 1988'' and inserting ''Section 36(e) of the Science and Engineering Equal Opportunities Act''.

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

(h) COORDINATION.—In carrying out this section, the Director shall, for purposes of enhancing program effectiveness and avoiding duplication of activities, consult, cooperate, and coordinate with the programs and policies of other relevant Federal agencies.

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

(a) IN GENERAL.—The Director shall award competitive grants to institutions of higher education or nonprofit organizations (or a consortium thereof, which may include a private sector partner) to conduct research on online STEM education courses for rural communities.

(b) RESEARCH AREAS.—The research areas eligible for funding under this section shall include—

(1) evaluating the learning and achievement of rural students in prekindergarten through grade 12 in STEM subjects;

(2) understanding how computer-based and online professional development courses and mentor experiences can be integrated to meet the needs of educators of rural students in prekindergarten through grade 12;

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

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

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

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

(d) ACCOUNTABILITY AND DISSEMINATION.—

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

(A) use a common set of benchmarks and tools to assess the results of research conducted

under such grants and identify best practices; and

(B) to the extent practicable, integrate findings from activities carried out pursuant to research conducted under this section, with respect to the pursuit of careers and degrees in STEM, with those activities carried our pursuant to other research on serving rural students and communities.

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

(A) the results of the evaluation; and

(B) any recommendations for administrative and legislative action that could optimize the effectiveness of the grants awarded under this section.

(e) COORDINATION.—In carrying out this section, the Director shall, for purposes of enhancing program effectiveness and avoiding duplication of activities, consult, cooperate, and coordinate with the programs and policies of other relevant Federal agencies.

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

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

(1) evaluates the quality and quantity of current Federal programming and research directed at examining STEM education for students in prekindergarten through grade 12 and workforce development in rural areas;

(2) in coordination with the Federal Communications Commission, assesses the impact the scarcity of broadband connectivity in rural communities has on STEM and technical literacy for students in prekindergarten through grade 12 in rural areas;

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

(4) makes recommendations for action at the Federal, State, and local levels for improving STEM education, including online STEM education, for students in prekindergarten through grade 12 and workforce development in rural areas.

(b) REPORT TO DIRECTOR.—The agreement entered into under subsection (a) shall require the National Academy of Sciences, not later than 24 months after the date of enactment of this Act, to submit to the Director a report on the study conducted under such subsection, including the National Academy's findings and recommendations.

**SEC. 6. GAO REVIEW.**

Not later than 3 years after the date of enactment of this Act, the Comptroller General of the United States shall conduct a study on the engagement of rural populations in Federal STEM programs and submit to Congress a report that includes—

(1) an assessment of how Federal STEM education programs are serving rural populations;

(2) a description of initiatives carried out by Federal agencies that are targeted at supporting STEM education in rural areas;

(3) an assessment of what is known about the impact and effectiveness of Federal investments in STEM education programs that are targeted to rural areas; and

(4) an assessment of challenges that State and Federal STEM education programs face in reaching rural population centers.

**SEC. 7. CAPACITY BUILDING THROUGH EPSCOR.**

Section 517(f)(2) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–9(f)(2)) is amended—

(1) in subparagraph (A), by striking ''and'' at the end; and

(2) by adding at the end the following:

''(C) to increase the capacity of rural communities to provide quality STEM education and STEM workforce development programming to students and teachers; and''.

**SEC. 8. NIST ENGAGEMENT WITH RURAL COMMUNITIES.**

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

(1) in subsection (c)—

(A) in paragraph (6), by striking ''community colleges and area career and technical education schools'' and inserting the following: ''secondary schools (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801)), community colleges, and area career and technical education schools, including those in underserved and rural communities,''; and

(B) in paragraph (7)—

(i) by striking ''and local colleges'' and inserting the following: ''local high schools and local colleges, including those in underserved and rural communities,''; and

(ii) by inserting ''or other applied learning opportunities'' after ''apprenticeships''; and

(2) in subsection (d)(3) by striking '', community colleges, and area career and technical education schools,'' and inserting the following: ''and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,''.

(b) RURAL CONNECTIVITY PRIZE COMPETITION.—

(1) PRIZE COMPETITION.—Pursuant to section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719), the Secretary of Commerce, acting through the Under Secretary of Commerce for Standards and Technology (referred to in this subsection as the ''Secretary''), shall carry out a program to award prizes competitively to stimulate research and development of creative technologies in order to deploy affordable and reliable

broadband connectivity to unserved rural communities.

(2) PLAN FOR DEPLOYMENT IN RURAL COMMUNITIES.—Each proposal submitted pursuant to paragraph (1) shall include a plan for deployment of the technology that is the subject of such proposal in an unserved rural community.

(3) PRIZE AMOUNT.—In carrying out the program under paragraph (1), the Secretary may award not more than a total of $5,000,000 to one or more winners of the prize competition.

(4) REPORT.—Not later than 60 days after the date on which a prize is awarded under the prize competition, the Secretary shall submit to the relevant committees of Congress a report that describes the winning proposal of the prize competition.

(5) CONSULTATION.—In carrying out the program under this subsection, the Secretary shall consult with the Federal Communications Commission and the heads of relevant departments and agencies of the Federal Government.

**SEC. 9. NITR-D BROADBAND WORKING GROUP.**

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

**"SEC. 103. BROADBAND RESEARCH AND DEVELOPMENT WORKING GROUP.**

''(a) IN GENERAL.—The Director shall establish a broadband research and development working group to address national research challenges and opportunities for improving broadband access and adoption across the United States.

''(b) ACTIVITIES.—The working group shall identify and coordinate key research priorities for addressing broadband access and adoption, including—

''(1) promising research areas;

''(2) requirements for data collection and sharing;

''(3) opportunities for better alignment and coordination across Federal agencies and external stakeholders; and

''(4) input on the development of new Federal policies and programs to enhance data collection and research.

''(c) COORDINATION.—The working group shall coordinate, as appropriate, with the Rural Broadband Integration Working Group established under section 6214 of the Agriculture Improvement Act of 2018 (Public Law 115–334), the National Institute of Food and Agriculture of the Department of Agriculture, and the Federal Communications Commission.

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

''(e) SUNSET.—The authority to carry out this section shall terminate on the date that is 5 years after the date of enactment of the Rural STEM Education Act.''.

**SEC. 10. DEFINITIONS.**

In this Act:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation established under section 2 of the National Science Foundation Act of 1950 (42 U.S.C. 1861).

(2) FEDERAL LABORATORY.—The term ''Federal laboratory'' has the meaning given such term in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703).

(3) FOUNDATION.—The term ''Foundation'' means the National Science Foundation established under section 2 of the National Science Foundation Act of 1950 (42 U.S.C. 1861).

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

(5) STEM.—The term ''STEM'' has the meaning given the term in section 2 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621 note).

(6) STEM EDUCATION.—The term ''STEM education'' has the meaning given the term in section 2 of the STEM Education Act of 2015 (42 U.S.C. 6621 note).