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HOUSE OF REPRESENTATIVES

REPORT
116–397

RURAL STEM EDUCATION ACT

FEBRUARY 13, 2020.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Ms. JOHNSON of Texas, from the Committee on Science, Space, and Technology, submitted the following

R E P O R T

[To accompany H.R. 4979]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (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, having considered the same, reports favorably thereon with an amendment and recommends that the bill as amended do pass.

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99–006

I. AMENDMENT

The amendment is as follows:
Strike all after the enacting clause and insert the following:

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 one million additional STEM professionals than it 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, nine million students in the United States—nearly 20 percent of the total K–12 population—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, math, geology, computer science, and other scientific fields.

(8) It is estimated that by 2020 that there will be a projected one million 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 grades PreK - 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 section shall be used for the research and development activities referred to in paragraph (1), which may include—

(i) engaging rural educators of students in grades Pre-K through 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 may 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 grades Pre-K through 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 grades Pre-K through 12 in STEM studies.

(2) USE OF FUNDS.—

(A) IN GENERAL.—Grants awarded under this section 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 research and extension services 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 grades Pre–K through 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 grades PreK - 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 grades Pre-K through 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 grades Pre-K through 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 Foundation 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.

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

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

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

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 subsection shall include—

(1) evaluating the learning and achievement of rural students in grades Pre–K through 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 grades Pre–K through 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 subsection.

(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 grades Pre–K through 12 and workforce development in rural areas;

(2) assesses the impact of the scarcity of broadband connectivity in rural communities has on STEM and technical literacy for students in grades Pre–K through 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 for students in grades Pre–K through 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.

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

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 underserved 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 underserved 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 subsection (a), the Secretary may consult with 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) and the National Institute of Food and Agriculture of the Department of Agriculture.

"(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).

II. PURPOSE OF THE BILL

The purpose of the bill is 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.

III. BACKGROUND AND NEED FOR THE LEGISLATION

The National Science Foundation (NSF) continues to make the largest financial investment in STEM education of all federal science agencies and plays a leadership role in setting research and policy agendas. During the 1990s and into the early 2000s, NSF invested more than $140,000,000 into the Rural Systemic Initiative projects (RSIs), which focused on the improvement of mathematics and science education in rural America. However, since the RSIs ended, there has been a reduced focus on effective STEM practices in rural settings at NSF.

According to the Bureau of Labor Statistics, STEM occupations are growing faster than any other sector. As these occupations grow, employers are struggling to find workers with the STEM knowledge and skills they need, resulting in what is often referred to as the "STEM skills gap." With STEM education becoming so fundamental to success in any industry, finding ways to improve the quality of STEM learning everywhere is of critical importance. However, the roughly 60 million Americans who live in rural settings are frequently overlooked and a significantly underrepresented STEM audience.

Many of the nine million students enrolled in rural schools in the U.S. face barriers to high-quality STEM education, including shortages of mathematics and science teachers, high teacher turnover, limited resources, and few local university and industry partners. Students in rural communities represent a promising but underuti-

lized source of STEM talent that could help close the STEM skills gap, if given the opportunity.

The *Rural STEM Education Act* provides for research and development to increase the capacity of rural communities to provide high quality STEM education and contribute to the Nation's STEM workforce needs.

IV. Committee Hearings

On May 8, 2019, the Subcommittee on Research and Technology held a hearing entitled, "A Review of the National Science Foundation FY2020 Budget Request." Witnesses were: Dr. France Córdova, Director, National Science Foundation, and Dr. Diane Souvaine, Chair, National Science Board.

On May 9, 2019, the full Committee held a hearing entitled, "Achieving the Promise of a Diverse STEM Workforce." Witnesses were: Dr. Mae Jemison, Principal, 100 Years Starship; Dr. Shirley Malcom, Senior Advisor and Director of SEA Change, American Association for the Advancement of Science; Dr. Lorelle Espinosa, Vice President for Research, American Council on Education; Dr. James L. Moore III, Vice Provost for Diversity and Inclusion and Chief Diversity Officer, The Ohio State University; and Ms. Barbara Whye, Chief Diversity and Inclusion Officer, Vice President of Human Resources, Intel.

V. Committee Consideration and Votes

On November 5, 2019, Ranking Member Frank Lucas, Representative Ben McAdams, Representative James Baird, and Chairwoman Eddie Bernice Johnson introduced H.R. 4979, the *Rural STEM Education Act.* The bill was referred to the House Committee on Science, Space, and Technology.

On November 14, 2019, the Committee on Science, Space, and Technology met to consider H.R. 4979. Ranking Member Lucas offered an amendment to make technical changes and incorporate feedback from stakeholders, including the National Academies of Sciences, Engineering, and Medicine and the Office of Science and Technology Policy. *The amendment was agreed to on a voice vote.* Next, Representative Jaime Herrera Beutler offered an amendment to further highlight the importance of computer sciences; a discipline covered by the Act. The amendment was agreed to on a voice vote. Finally, Representative McAdams offered an amendment to commission a GAO study on the engagement of rural populations in Federal STEM programs. The amendment was agreed to on a voice vote. Chairwoman Eddie Bernice Johnson moved that the Committee favorably report the bill, H.R. 4979, to the House with the recommendation that the bill be approved. The motion was agreed to by a voice vote.

VI. Summary of Major Provisions of the Bill

The Act directs NSF to support research and development activities to improve our understanding of the challenges rural communities are facing in providing and sustaining quality STEM education programs by authorizing NSF grants to support research to improve STEM teaching in rural schools, improve participation and the advancement of rural students in STEM studies, and research

online STEM education and mentoring in rural communities. It directs a National Academies study on rural STEM education, including an evaluation of the impact of the scarcity of broadband connectivity on STEM education, and a GAO review to assess how Federal STEM education programs are serving rural populations.

The Act also updates the Established Program to Stimulate Competitive Research (EPSCoR) program to include an allowance for funding STEM education and STEM workforce development programs in underserved rural communities. It expands the scope of the National Institute of Standards and Technology's (NIST) Manufacturing Extension Partnership (MEP) program to include engagement with secondary schools and directs NIST to establish a prize competition on creative technologies to deploy affordable and reliable broadband to underserved rural communities. Further, the Act codifies the Networking Information Technology Research and Development (NITRD) program's Broadband R&D working group and directs a report to Congress on its activities.

VII. Section-by-Section Analysis (by Title and Section)

Section 1. Short title

Rural STEM Education Act.

Section 2. Findings

This section highlights the challenges rural communities face in providing high quality STEM education and the need for research to help address these challenges.

Section 3. National Science Foundation rural STEM activities

This section directs the National Science Foundation (NSF) to award competitive grants to institutions of higher education or nonprofit organizations to expand the research and development of programming or curriculum to advance innovative approaches to the challenges of supporting and sustaining high-quality PreK–12 STEM teaching in rural schools. Activities supported by these grants include developing tools to assist rural educators who teach multiple grade levels within a STEM discipline, coordinating with local partners to leverage local natural and community assets in order to support in-place learning, and providing hands-on training and research opportunities at Federal Laboratories, research institutions, or industry for PreK–12 rural educators. This section authorizes $8,000,000 per year for five years to support these activities.

This section also directs NSF to award competitive grants to institutions of higher education or nonprofit organizations for the research and development of programming or curricula to identify the barriers rural students face in accessing high-quality STEM education and develop innovative solutions to improve the participation and advancement of rural students in STEM studies. Activities supported by these grants include developing partnerships with community colleges to offer advanced STEM course work to rural high school students, collaborating with existing community partners and networks, such as the cooperative research and extension services of the Department of Agriculture, to leverage community resources and develop place-based programming, and to evalu-

ate the role of connectivity and its impact on rural students' STEM and technology literacy. This section authorizes $12,000,000 per year for five years to support these activities.

This section also directs the NSF Committee on Equal Opportunities in Science and Engineering (CEOSE) to report to Congress an assessment of NSF activities that support participation of rural students in STEM studies.

Section 4. Opportunities for online education

This section directs NSF to award competitive grants to institutions of higher education or nonprofit organizations to conduct research to evaluate student outcomes and establish best practices and scalability of computer-based and online STEM education courses for rural communities.

Section 5. National Academy of Sciences evaluation

This section directs NSF to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine for a study that includes an evaluation of Federal investments in rural STEM education, an assessment of research and data needs, and recommendations for improving STEM education in rural communities. This section authorizes $1,000,000 in appropriations for fiscal year 2020 to carry out this section.

Section 6. Capacity building through EPSCoR

This section amends the America COMPETES Reauthorization Act of 2010 to expand the authorized activities under the EPSCoR program by allowing them to fund grants intended to increase the capacity of rural communities to provide quality STEM education and STEM workforce development programming to students and teachers.

Section 7. NIST engagement with rural communities

This section amends the MEP program to allow their education and workforce development activities to include outreach and engagement with local high schools, including those in underserved and rural communities. This section also directs NIST to conduct a prize competition to stimulate research and development of creative technologies in order to deploy affordable and reliable broadband connectivity to underserved rural communities.

Section 8. NITR–D broadband working group

This section codifies the NITRD program's working group on broadband research and development to address national research challenges and opportunities for improving broadband access and adoption across the United States. This section also sunsets the Working Group five years after enactment of the Act.

Section 9. Definitions

Definitions for "STEM", "STEM Education", "Institution of Higher Education", and "Federal Laboratory".

VIII. Committee Views

The intent of this legislation is to improve the understanding of the unique challenges rural communities face in providing and sus-

taining quality STEM education programs through research and to develop tools to close these STEM skills gaps and ensure rural students have equitable access to high-paying STEM careers.

The Committee intends that cooperative extension and applied research programs that are implemented by a land-grant college or university are eligible to lead grants authorized in Section 3 of this Act, as appropriate. Given their relationships with rural communities, NSF should explore opportunities to leverage cooperative extension and applied research networks to meet the goals of this Act. The Committee also believes it is important to bring science to rural students, meeting them where they are and demonstrating the applicability of STEM skills in their community through place-based learning.

The Committee intends that the term "STEM" when referencing courses, coursework, and teacher training, includes core courses, such as mathematics, biology, chemistry, and physics.

It is the intent of the Committee, by encouraging partnerships with a consortium of rural schools, to allow for rural schools to coordinate their limited resources to apply for grants. The Committee also intends to ensure that researcher-practitioner partnerships are balanced and equally beneficial to all parties involved. The Committee also finds it is important to have buy-in from the school leadership, especially given the relatively small size of rural schools, that improved access to quality STEM learning is a priority.

The Committee finds connectivity and access to broadband play a critical role in ensuring students are prepared to compete in a 21st Century economy.

IX. Cost Estimate

Pursuant to clause 3(c)(2) of rule XIII of the Rules of the House of Representatives, the Committee adopts as its own the estimate of new budget authority, entitlement authority, or tax expenditures or revenues contained in the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

X. Congressional Budget Office Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, January 7, 2020.

Hon. Eddie Bernice Johnson,
Chairwoman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

Dear Madam Chairwoman: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 4979, the Rural STEM Education Act.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Janani Shankaran.

Sincerely,

Phillip L. Swagel,
Director.

Enclosure.

At a Glance

H.R. 4979, Rural STEM Education Act

As ordered reported by the House Committee on Science, Space, and Technology on November 14, 2019

By Fiscal Year, Millions of Dollars	2020	2020-2024	2020-2029
Direct Spending (Outlays)	0	0	0
Revenues	0	0	0
Increase or Decrease (-) in the Deficit	0	0	0
Spending Subject to Appropriation (Outlays)	1	58	107

		Mandate Effects	
Statutory pay-as-you-go procedures apply?	No		
Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2030?	No	Contains intergovernmental mandate?	No
		Contains private-sector mandate?	No

The bill would:

- Authorize the appropriation of $120 million over the 2020–2025 period for the National Science Foundation to award grants for research to improve rural students' access to and participation in the fields of science, technology, engineering, and mathematics
- Direct the National Institute of Standards and Technology to carry out a prize competition for ideas to deploy affordable and reliable broadband connectivity to underserved rural communities

Estimated budgetary effects would primarily stem from:

- Spending of the authorized appropriations

Bill summary: H.R. 4979 would authorize the appropriation of $120 million over the 2020–2025 period for the National Science Foundation (NSF) to award grants for research to improve rural students' access to and participation in the fields of science, technology, engineering, and mathematics (STEM).

The bill also would require the National Institute of Standards and Technology (NIST) to carry out a prize competition for ideas to deploy affordable and reliable broadband connectivity to underserved rural communities. Finally, H.R. 4979 would authorize the appropriation of $1 million for the NSF to enter into an agreement with the National Academies to evaluate federal programs and research that focus on STEM education and workforce development in rural areas.

Estimated Federal cost: The estimated budgetary effect of H.R. 4979 is shown in Table 1. The costs of the legislation fall primarily within budget functions 250 (science, space, and technology) and 370 (commerce and housing credit).

TABLE 1.—ESTIMATED INCREASES IN SPENDING SUBJECT TO APPROPRIATION UNDER H.R. 4979

	By fiscal year, millions of dollars—					
	2020	2021	2022	2023	2024	2020–2024
National Science Foundation Grants:						
Estimated Authorization [a]	20	20	20	20	20	100
Estimated Outlays	0	4	11	16	20	51

TABLE 1.—ESTIMATED INCREASES IN SPENDING SUBJECT TO APPROPRIATION UNDER H.R. 4979—Continued

	By fiscal year, millions of dollars—					
	2020	2021	2022	2023	2024	2020–2024
Prize Competition:						
Estimated Authorization	5	0	0	0	0	5
Estimated Outlays	0	3	2	0	0	5
Other Activities:						
Estimated Authorization	2	0	0	0	0	2
Estimated Outlays	1	1	0	0	0	2
Total Changes:						
Estimated Authorization	27	20	20	20	20	107
Estimated Outlays	1	8	13	16	20	58

[a] Section 3 of H.R. 4979 would authorize the appropriation of $20 million in 2020 for the National Science Foundation to award grants. CBO does not estimate any outlays for that authorization because appropriations have already been provided for 2020.

Basis of estimate: For this estimate, CBO assumes that the legislation will be enacted in 2020 and that the authorized and necessary amounts will be provided in each year. Estimated outlays are based on historical spending patterns for similar programs.

CBO estimates that implementing H.R. 4979 would cost $58 million over the 2020–2024 period.

National Science Foundation grants: Section 3 would authorize the appropriation of $8 million annually over the 2020–2025 period for the NSF to award grants for research on innovative approaches to STEM education in rural schools. The bill also would authorize the appropriation of $12 million annually over the same period for grants to identify barriers that rural students face in accessing STEM education, and to improve the participation of rural students in STEM fields.

Using information from the NSF, CBO estimates that in 2019, the agency allocated more than $20 million for those grants. Because appropriations for 2020 have already been provided, CBO does not estimate any outlays for the authorization of $20 million in 2020. We estimate that the authorization of appropriations for grants from 2021 through 2025 would cost $51 million over the 2020–2024 period and $49 million after 2024.

Prize competition: Section 8 would direct NIST to carry out a prize competition and award up to $5 million in prizes for ideas that could improve the deployment of broadband connectivity to underserved rural communities. CBO estimates that implementing the provision would cost $5 million over the 2020–2022 period.

Other activities: Section 5 would authorize the appropriation of $1 million in 2020 for the NSF to enter into an agreement with the National Academies to evaluate federal programs and research that focus on STEM education and workforce development in rural areas. CBO estimates that conducting the evaluation would cost $1 million over the 2020–2021 period.

In addition, H.R. 4979 would direct the NSF to report to the Congress on grants awarded under the bill and on agency policies and activities that encourage the participation of rural students in STEM and computer science. The bill also would require the Government Accountability Office to study how federal STEM programs serve rural communities. Based on the costs of similar tasks, CBO estimates that conducting those activities would cost $1 million over the 2020–2021 period.

Finally, section 4 would direct the NSF to award grants for research on online STEM education courses for rural communities, and section 8 would require the Office of Science and Technology Policy to establish a broadband research and development working group. Using information from those agencies, CBO estimates that implementing those provisions would have no significant effect on the federal budget because the agencies are already meeting those requirements.

Pay-As-You-Go considerations: None.

Increase in long-term deficits: None.

Mandates: None.

Estimate prepared by: Federal costs: Janani Shankaran (National Science Foundation), David Hughes (National Institute of Standards and Technology); Mandates: Brandon Lever.

Estimate reviewed by: Kim P. Cawley, Chief, Natural and Physical Resources Cost Estimates Unit; H. Samuel Papenfuss, Deputy Director of Budget Analysis.

XI. Federal Mandates Statement

H.R. 4979 contains no unfunded mandates.

XII. Committee Oversight Findings and Recommendations

The Committee's oversight findings and recommendations are reflected in the body of this report.

XIII. Statement on General Performance Goals and Objectives

Pursuant to clause 3(c) of House Rule XIII, the goal of H.R. 4979 is to provide for research and development to improve STEM education in rural communities.

XIV. Federal Advisory Committee Statement

H.R. 4979 does not create any advisory committees.

XV. Duplication of Federal Programs

Pursuant to clause 3(c)(5) of rule XIII of the Rules of the House of Representatives, the Committee finds that no provision of H.R. 4979 establishes or reauthorizes a program of the federal government known to be duplicative of another federal program, including any program that was included in a report to Congress pursuant to section 21 of Public Law 111–139 or the most recent Catalog of Federal Domestic Assistance.

XVI. Earmark Identification

Pursuant to clause 9(e), 9(f), and 9(g) of rule XXI, the Committee finds that H.R. 4979 contains no earmarks, limited tax benefits, or limited tariff benefits.

XVII. Applicability to the Legislative Branch

The Committee finds that H.R. 4979 does not relate to the terms and conditions of employment or access to public services or accom-

modations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVIII. Statement on Preemption of State, Local, or Tribal Law

This bill is not intended to preempt any state, local, or tribal law.

XIX. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, and existing law in which no change is proposed is shown in roman):

AMERICAN INNOVATION AND COMPETITIVENESS ACT

* * * * * * *

TITLE III—SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH EDUCATION

* * * * * * *

SEC. 313. NSF REPORT ON BROADENING PARTICIPATION.

[Section 204(e) of the National Science Foundation Authorization Act of 1988] *Section 36(e) of the Science and Engineering Equal Opportunities Act* (42 U.S.C. 1885c(e)) is amended to read as follows:

"(e) Biennial Report.—Every 2 years, the Committee shall prepare and submit to the Director a report on its activities during the previous 2 years and proposed activities for the next 2 years. The Director shall submit to Congress the report, unaltered, together with such comments as the Director considers appropriate, including—

"(1) review data on the participation in Foundation activities of institutions serving populations that are underrepresented in STEM disciplines, including poor, rural, and tribal populations; and

"(2) recommendations regarding how the Foundation could improve outreach and inclusion of these populations in Foundation activities.".

* * * * * * *

AMERICA COMPETES REAUTHORIZATION ACT OF 2010

* * * * * * *

TITLE V—SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS SUPPORT PROGRAMS SUBTITLE A—NATIONAL SCIENCE FOUNDATION

Subtitle A—NATIONAL SCIENCE FOUNDATION

* * * * * * *

SEC. 517. EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH.

(a) FINDINGS.—The Congress finds that—

(1) the National Science Foundation Act of 1950 stated, "it shall be an objective of the Foundation to strengthen research and education in the sciences and engineering, including independent research by individuals, throughout the United States, and to avoid undue concentration of such research and education";

(2) National Science Foundation funding remains highly concentrated, with 28 States and jurisdictions, taken together, receiving only about 12 percent of all National Science Foundation research funding;

(3) each of the States described in paragraph (2) receives only a fraction of 1 percent of the Foundation's research dollars each year;

(4) first established at the National Science Foundation in 1979, the Experimental Program to Stimulate Competitive Research (referred to in this section as "EPSCoR") assists States and jurisdictions historically underserved by Federal research and development funding in strengthening their research and innovation capabilities;

(5) the EPSCoR structure requires each participating State to develop a science and technology plan suited to State and local research, education, and economic interests and objectives;

(6) EPSCoR has been credited with advancing the research competitiveness of participating States, improving awareness of science, promoting policies that link scientific investment and economic growth, and encouraging partnerships between government, industry, and academia;

(7) EPSCoR proposals are evaluated through a rigorous and competitive merit-review process to ensure that awarded research and development efforts meet high scientific standards; and

(8) according to the National Academy of Sciences, EPSCoR has strengthened the national research infrastructure and enhanced the educational opportunities needed to develop the science and engineering workforce.

(b) CONTINUATION OF PROGRAM.—The Director shall continue to carry out EPSCoR, with the objective of helping the eligible States to develop the research infrastructure that will make them more competitive for Foundation and other Federal research funding.

The program shall continue to increase as the National Science Foundation funding increases.

(c) COORDINATION OF EPSCoR AND SIMILAR FEDERAL PROGRAMS.—

(1) ANOTHER FINDING.—The Congress finds that a number of Federal agencies have programs, such as EPSCoR and the National Institutes of Health Institutional Development Award program, designed to increase the capacity for and quality of science and technology research and training at academic institutions in States that historically have received relatively little Federal research and development funding.

(2) COORDINATION REQUIRED.—The EPSCoR Interagency Coordinating Committee, chaired by the National Science Foundation, shall—

(A) coordinate each EPSCoR to maximize the impact of Federal support for building competitive research infrastructure, and in order to achieve an integrated Federal effort;

(B) coordinate agency objectives with State and institutional goals, to obtain continued non-Federal support of science and technology research and training;

(C) develop metrics to assess gains in academic research quality and competitiveness, and in science and technology human resource development;

(D) conduct a cross-agency evaluation of each EPSCoR and accomplishments, including management, investment, and metric-measuring strategies implemented by the different agencies aimed to increase the number of new investigators receiving peer-reviewed funding, broaden participation, and empower knowledge generation, dissemination, application, and national research and development competitiveness;

(E) coordinate the development and implementation of new, novel workshops, outreach activities, and follow-up mentoring activities among EPSCoR or EPSCoR-like programs for colleges and universities in EPSCoR States and territories in order to increase the number of proposals submitted and successfully funded and to enhance statewide coordination of each EPSCoR;

(F) coordinate the development of new, innovative solicitations and programs to facilitate collaborations, partnerships, and mentoring activities among faculty at all levels in non-EPSCoR and EPSCoR States and jurisdictions;

(G) conduct an evaluation of the roles, responsibilities and degree of autonomy that program officers or managers (or the equivalent position) have in executing each EPSCoR at the different Federal agencies and the impacts these differences have on the number of EPSCoR State and jurisdiction faculty participating in the peer review process and the percentage of successful awards by individual EPSCoR State jurisdiction and individual researcher; and

(H) conduct a survey of colleges and university faculty at all levels regarding their knowledge and understanding of EPSCoR, and their level of interaction with and knowledge

about their respective State or Jurisdictional EPSCoR Committee.

(3) MEETINGS AND REPORTS.—The Committee shall meet at least twice each fiscal year and shall submit an annual report to the appropriate committees of Congress describing progress made in carrying out paragraph (2).

(d) FEDERAL AGENCY REPORTS.—Each Federal agency that administers an EPSCoR shall submit to Congress, as part of its Federal budget submission—

(1) a description of the program strategy and objectives;

(2) a description of the awards made in the previous fiscal year, including—

(A) the total amount made available, by State, under EPSCoR;

(B) the total amount of agency funding made available to all institutions and entities within each EPSCoR State;

(C) the efforts and accomplishments to more fully integrate the EPSCoR States in major agency activities and initiatives;

(D) the percentage of EPSCoR reviewers from EPSCoR States; and

(E) the number of programs or large collaborator awards involving a partnership of organizations and institutions from EPSCoR and non-EPSCoR States; and

(3) an analysis of the gains in academic research quality and competitiveness, and in science and technology human resource development, achieved by the program over the last 5 fiscal years.

(e) NATIONAL ACADEMY OF SCIENCES STUDY.—

(1) IN GENERAL.—The Director shall contract with the National Academy of Sciences to conduct a study on all Federal agencies that administer an EPSCoR.

(2) MATTERS TO BE ADDRESSED.—The study conducted under paragraph (1) shall include the following:

(A) A delineation of the policies of each Federal agency with respect to the awarding of grants to EPSCoR States.

(B) The effectiveness of each program.

(C) Recommendations for improvements for each agency to achieve EPSCoR goals.

(D) An assessment of the effectiveness of EPSCoR States in using awards to develop science and engineering research and education, and science and engineering infrastructure within their States.

(E) Such other issues that address the effectiveness of EPSCoR as the National Academy of Sciences considers appropriate.

(f) AWARD STRUCTURE UPDATES.—In implementing the mandate to maximize the impact of Federal EPSCoR support on building competitive research infrastructure, and based on the inputs and recommendations of previous EPSCoR reviews, the head of each Federal agency administering an EPSCoR program shall—

(1) consider modifications to EPSCoR proposal solicitation, award type, and project evaluation—

(A) to more closely align with current agency priorities and initiatives;

(B) to focus EPSCoR funding on achieving critical scientific, infrastructure, and educational needs of that agency;

(C) to encourage collaboration between EPSCoR-eligible institutions and researchers, including with institutions and researchers in other States and jurisdictions;

(D) to improve communication between State and Federal agency proposal reviewers; and

(E) to continue to reduce administrative burdens associated with EPSCoR;

(2) consider modifications to EPSCoR award structures—

(A) to emphasize long-term investments in building research capacity, potentially through the use of larger, renewable funding opportunities; [and]

(B) to allow the agency, States, and jurisdictions to experiment with new research and development funding models; and

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

(3) consider modifications to the mechanisms used to monitor and evaluate EPSCoR awards—

(A) to increase collaboration between EPSCoR-funded researchers and agency staff, including by providing opportunities for mentoring young researchers and for the use of Federal facilities;

(B) to identify and disseminate best practices; and

(C) to harmonize metrics across participating Federal agencies, as appropriate.

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NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT

* * * * * * *

SEC. 25. HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.

(a) DEFINITIONS.—In this section:

(1) APPROPRIATE COMMITTEES OF CONGRESS.—The term "appropriate committees of Congress" means—

(A) the Committee on Commerce, Science, and Transportation of the Senate; and

(B) the Committee on Science, Space, and Technology of the House of Representatives.

(2) AREA CAREER AND TECHNICAL EDUCATION SCHOOL.—The term "area career and technical education school" has the meaning given the term in section 3 of the Vocational Education Act of 1963 (20 U.S.C. 2302).

(3) CENTER.—The term "Center" means a manufacturing extension center that—

(A) is created under subsection (b); and

(B) is affiliated with an eligible entity that applies for and is awarded financial support under subsection (e).

(4) COMMUNITY COLLEGE.—The term "community college" means an institution of higher education (as defined under sec-

tion 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))) at which the highest degree that is predominately awarded to students is an associate's degree.

(5) ELIGIBLE ENTITY.—The term "eligible entity" means a United States-based nonprofit institution, or consortium thereof, an institution of higher education, or a State, United States territory, local, or tribal government.

(6) HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP OR PROGRAM.—The term "Hollings Manufacturing Extension Partnership" or "Program" means the program established under subsection (b).

(7) MEP ADVISORY BOARD.—The term "MEP Advisory Board" means the Manufacturing Extension Partnership Advisory Board established under subsection (n).

(b) ESTABLISHMENT AND PURPOSE.—The Secretary, acting through the Director and, if appropriate, through other Federal officials, shall establish a program to provide assistance for the creation and support of manufacturing extension centers for the transfer of manufacturing technology and best business practices.

(c) OBJECTIVE.—The objective of the Program shall be to enhance competitiveness, productivity, and technological performance in United States manufacturing through—

(1) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

(2) the participation of individuals from industry, institutions of higher education, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

(3) efforts to make new manufacturing technology and processes usable by United States-based small and medium-sized companies;

(4) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small and medium-sized manufacturing companies;

(5) the utilization, when appropriate, of the expertise and capability that exists in Federal agencies, other than the Institute, and federally-sponsored laboratories;

(6) the provision to ⟦community colleges and area career and technical education schools⟧ *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,* of information about the job skills needed in manufacturing companies, including small and medium-sized manufacturing businesses in the regions they serve;

(7) the promotion and expansion of certification systems offered through industry, associations, ⟦and local colleges⟧ *local high schools and local colleges, including those in underserved and rural communities,* when appropriate, including efforts such as facilitating training, supporting new or existing apprenticeships *or other applied learning opportunities*, and providing access to information and experts, to address workforce

needs and skills gaps in order to assist small- and medium-sized manufacturing businesses; and

(8) the growth in employment and wages at United States-based small and medium-sized companies.

(d) ACTIVITIES.—The activities of a Center shall include—

(1) the establishment of automated manufacturing systems and other advanced production technologies, based on Institute-supported research, for the purpose of demonstrations and technology transfer;

(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small and medium-sized manufacturers; and

(3) the facilitation of collaborations and partnerships between small and medium-sized manufacturing companies**[**, community colleges, and area career and technical education schools,**]** *and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,* to help those entities better understand the specific needs of manufacturers and to help manufacturers better understand the skill sets that students learn in the programs offered by such colleges and schools.

(e) FINANCIAL ASSISTANCE.—

(1) AUTHORIZATION.—Except as provided in paragraph (2), the Secretary may provide financial assistance for the creation and support of a Center through a cooperative agreement with an eligible entity.

(2) COST SHARING.—The Secretary may not provide more than 50 percent of the capital and annual operating and maintenance funds required to establish and support a Center.

(3) RULE OF CONSTRUCTION.—For purposes of paragraph (2), any amount received by an eligible entity for a Center under a provision of law other than paragraph (1) shall not be considered an amount provided under paragraph (1).

(4) REGULATIONS.—The Secretary may revise or promulgate such regulations as necessary to carry out this subsection.

(f) APPLICATIONS.—

(1) IN GENERAL.—An eligible entity shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require.

(2) PROGRAM DESCRIPTION.—The Secretary shall establish and update, as necessary—

(A) a description of the Program;

(B) the application procedures;

(C) performance metrics;

(D) criteria for determining qualified applicants; and

(E) criteria for choosing recipients of financial assistance from among the qualified applicants.

(F) procedures for determining allowable cost share contributions; and

(G) such other program policy objectives and operational procedures as the Secretary considers necessary.

(3) COST SHARING.—

(A) IN GENERAL.—To be considered for financial assistance under this section, an applicant shall provide ade-

quate assurances that the applicant and if applicable, the applicant's partnering organizations, will obtain funding for not less than 50 percent of the capital and annual operating and maintenance funds required to establish and support the Center from sources other than the financial assistance provided under subsection (e).

(B) AGREEMENTS WITH OTHER ENTITIES.—In meeting the cost-sharing requirement under subparagraph (A), an eligible entity may enter into an agreement with 1 or more other entities, such as a private industry, institutions of higher education, or a State, United States territory, local, or tribal government for the contribution by that other entity of funding if the Secretary determines the agreement—

(i) is programmatically reasonable;

(ii) will help accomplish programmatic objectives; and

(iii) is allocable under Program procedures under subsection (f)(2).

(4) LEGAL RIGHTS.—Each applicant shall include in the application a proposal for the allocation of the legal rights associated with any intellectual property which may result from the activities of the Center.

(5) MERIT REVIEW OF APPLICATIONS.—

(A) IN GENERAL.—The Secretary shall subject each application to merit review.

(B) CONSIDERATIONS.—In making a decision whether to approve an application and provide financial assistance under subsection (e), the Secretary shall consider, at a minimum—

(i) the merits of the application, particularly those portions of the application regarding technology transfer, training and education, and adaptation of manufacturing technologies to the needs of particular industrial sectors;

(ii) the quality of service to be provided;

(iii) the geographical diversity and extent of the service area; and

(iv) the type and percentage of funding and in-kind commitment from other sources under paragraph (3).

(g) EVALUATIONS.—

(1) THIRD AND EIGHTH YEAR EVALUATIONS BY PANEL.—

(A) IN GENERAL.—The Secretary shall ensure that each Center is evaluated during its third and eighth years of operation by an evaluation panel appointed by the Secretary.

(B) COMPOSITION.—The Secretary shall ensure that each evaluation panel appointed under subparagraph (A) is composed of—

(i) private experts, none of whom are connected with the Center evaluated by the panel; and

(ii) Federal officials.

(C) CHAIRPERSON.—For each evaluation panel appointed under subparagraph (B), the Secretary shall appoint a chairperson who is an official of the Institute.

(2) FIFTH YEAR EVALUATIONS BY SECRETARY.—In the fifth year of operation of a Center, the Secretary shall conduct a review of the Center.

(3) PERFORMANCE MEASUREMENT.—In evaluating a Center an evaluation panel or the Secretary, as applicable, shall measure the performance of the Center against—

(A) the objective specified in subsection (c);

(B) the performance metrics under subsection (f)(2)(C); and

(C) such other criterion as considered appropriate by the Secretary.

(4) POSITIVE EVALUATIONS.—If an evaluation of a Center is positive, the Secretary may continue to provide financial assistance for the Center—

(A) in the case of an evaluation occurring in the third year of a Center, through the fifth year of the Center;

(B) in the case of an evaluation occurring in the fifth year of a Center, through the eighth year of the Center; and

(C) in the case of an evaluation occurring in the eighth year of a Center, through the tenth year of the Center.

(5) OTHER THAN POSITIVE EVALUATIONS.—

(A) PROBATION.—If an evaluation of a Center is other than positive, the Secretary shall put the Center on probation during the period beginning on the date that the Center receives notice under subparagraph (B)(i) and ending on the date that the reevaluation is complete under subparagraph (B)(iii).

(B) NOTICE AND REEVALUATION.—If a Center receives an evaluation that is other than positive, the evaluation panel or Secretary, as applicable, shall—

(i) notify the Center of the reason, including any deficiencies in the performance of the Center identified during the evaluation;

(ii) assist the Center in remedying the deficiencies by providing the Center, not less frequently than once every 3 months, an analysis of the Center, if considered appropriate by the panel or Secretary, as applicable; and

(iii) reevaluate the Center not later than 1 year after the date of the notice under clause (i).

(C) CONTINUED SUPPORT DURING PERIOD OF PROBATION.—

(i) IN GENERAL.—The Secretary may continue to provide financial assistance under subsection (e) for a Center during the probation period.

(ii) POST PROBATION.—After the period of probation, the Secretary shall not provide any financial assistance unless the Center has received a positive evaluation under subparagraph (B)(iii).

(6) FAILURE TO REMEDY.—

(A) IN GENERAL.—If a Center fails to remedy a deficiency or to show significant improvement in performance before the end of the probation period under paragraph (5), the

Secretary shall conduct a competition to select an operator for the Center under subsection (h).

(B) TREATMENT OF CENTERS SUBJECT TO NEW COMPETITION.—Upon the selection of an operator for a Center under subsection (h), the Center shall be considered a new Center and the calculation of the years of operation of that Center for purposes of paragraphs (1) through (5) of this subsection and subsection (h)(1) shall start anew.

(h) REAPPLICATION COMPETITION FOR FINANCIAL ASSISTANCE AFTER 10 YEARS.—

(1) IN GENERAL.—If an eligible entity has operated a Center under this section for a period of 10 consecutive years, the Secretary shall conduct a competition to select an eligible entity to operate the Center in accordance with the process plan under subsection (i).

(2) INCUMBENT ELIGIBLE ENTITIES.—An eligible entity that has received financial assistance under this section for a period of 10 consecutive years and that the Secretary determines is in good standing shall be eligible to compete in the competition under paragraph (1).

(3) TREATMENT OF CENTERS SUBJECT TO REAPPLICATION COMPETITION.—Upon the selection of an operator for a Center under paragraph (1), the Center shall be considered a new Center and the calculation of the years of operation of that Center for purposes of paragraphs (1) through (5) of subsection (g) shall start anew.

(i) PROCESS PLAN.—Not later than 180 days after the date of the enactment of the American Innovation and Competitiveness Act, the Secretary shall implement and submit to Congress a plan for how the Institute will conduct an evaluation, competition, and reapplication competition under this section.

(j) OPERATIONAL REQUIREMENTS.—

(1) PROTECTION OF CONFIDENTIAL INFORMATION OF CENTER CLIENTS.—The following information, if obtained by the Federal Government in connection with an activity of a Center or the Program, shall be exempt from public disclosure under section 552 of title 5, United States Code:

(A) Information on the business operation of any participant in the Program or of a client of a Center.

(B) Trade secrets of any client of a Center.

(k) OVERSIGHT BOARDS.—

(1) IN GENERAL.—As a condition on receipt of financial assistance for a Center under subsection (e), an eligible entity shall establish a board to oversee the operations of the Center.

(2) STANDARDS.—

(A) IN GENERAL.—The Director shall establish appropriate standards for each board described under paragraph (1).

(B) CONSIDERATIONS.—In establishing the standards, the Director shall take into account the type and organizational structure of an eligible entity.

(C) REQUIREMENTS.—The standards shall address—

(i) membership;

(ii) composition;

(iii) term limits;

(iv) conflicts of interest; and

(v) such other requirements as the Director considers necessary.

(3) MEMBERSHIP.—

(A) IN GENERAL.—Each board established under paragraph (1) shall be composed of members as follows:

(i) The membership of each board shall be representative of stakeholders in the region in which the Center is located.

(ii) A majority of the members of the board shall be selected from among individuals who own or are employed by small or medium-sized manufacturers.

(B) LIMITATION.—A member of a board established under paragraph (1) may not serve on more than 1 board established under that paragraph.

(4) BYLAWS.—

(A) IN GENERAL.—Each board established under paragraph (1) shall adopt and submit to the Director bylaws to govern the operation of the board.

(B) CONFLICTS OF INTEREST.—Bylaws adopted under subparagraph (A) shall include policies to minimize conflicts of interest, including such policies relating to disclosure of relationships and recusal as may be necessary to minimize conflicts of interest.

(l) ACCEPTANCE OF FUNDS.—In addition to such sums as may be appropriated to the Secretary and Director to operate the Program, the Secretary and Director may also accept funds from other Federal departments and agencies and from the private sector under section 2(c)(7) of this Act (15 U.S.C. 272(c)(7)), to be available to the extent provided by appropriations Acts, for the purpose of strengthening United States manufacturing.

(m) MEP ADVISORY BOARD.—

(1) ESTABLISHMENT.—There is established within the Institute a Manufacturing Extension Partnership Advisory Board.

(2) MEMBERSHIP.—

(A) COMPOSITION.—

(i) IN GENERAL.—The MEP Advisory Board shall consist of not fewer than 10 members appointed by the Director and broadly representative of stakeholders.

(ii) REQUIREMENTS.—Of the members appointed under clause (i)—

(I) at least 2 members shall be employed by or on an advisory board for a Center;

(II) at least 5 members shall be from United States small businesses in the manufacturing sector; and

(III) at least 1 member shall represent a community college.

(iii) LIMITATION.—No member of the MEP Advisory Board shall be an employee of the Federal Government.

(B) TERM.—Except as provided in subparagraph (C), the term of office of each member of the MEP Advisory Board shall be 3 years.

(C) VACANCIES.—Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

(D) SERVING CONSECUTIVE TERMS.—Any person who has completed 2 consecutive full terms of service on the MEP Advisory Board shall thereafter be ineligible for appointment during the 1-year period following the expiration of the second such term.

(3) MEETINGS.—The MEP Advisory Board shall—

(A) meet not less than biannually; and

(B) provide to the Director—

(i) advice on the activities, plans, and policies of the Program;

(ii) assessments of the soundness of the plans and strategies of the Program; and

(iii) assessments of current performance against the plans of the Program.

(4) FACA APPLICABILITY.—

(A) IN GENERAL.—In discharging its duties under this subsection, the MEP Advisory Board shall function solely in an advisory capacity, in accordance with the Federal Advisory Committee Act (5 U.S.C. App.).

(B) EXCEPTION.—Section 14 of the Federal Advisory Committee Act shall not apply to the MEP Advisory Board.

(5) ANNUAL REPORT.—

(A) IN GENERAL.—At a minimum, the MEP Advisory Board shall transmit an annual report to the Secretary for transmittal to Congress not later than 30 days after the submission to Congress of the President's annual budget under section 1105 of title 31, United States Code.

(B) CONTENTS.—The report shall address the status of the Program and describe the relevant sections of the programmatic planning document and updates thereto transmitted to Congress by the Director under subsections (c) and (d) of section 23 (15 U.S.C. 278i).

(n) SMALL MANUFACTURERS.—

(1) EVALUATION OF OBSTACLES.—As part of the Program, the Director shall—

(A) identify obstacles that prevent small manufacturers from effectively competing in the global market;

(B) implement a comprehensive plan to train the Centers to address the obstacles identified in paragraph (2); and

(C) facilitate improved communication between the Centers to assist such manufacturers in implementing appropriate, targeted solutions to the obstacles identified in paragraph (2).

(2) DEVELOPMENT OF OPEN ACCESS RESOURCES.—As part of the Program, the Secretary shall develop open access resources that address best practices related to inventory sourcing, supply chain management, manufacturing techniques, available

Federal resources, and other topics to further the competitiveness and profitability of small manufacturers.

* * * * * * *

HIGH-PERFORMANCE COMPUTING ACT OF 1991

* * * * * * *

TITLE I—NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT

* * * * * * *

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) and the National Institute of Food and Agriculture of the Department of Agriculture.

(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.

* * * * * * *

XX. PROCEEDINGS OF THE FULL COMMITTEE MARKUP

MARKUPS: H.R. 4704, ADVANCING RESEARCH TO PREVENT SUICIDE ACT; H.R. 4990, ELECTION TECHNOLOGY RESEARCH ACT; AND H.R. 4979, RURAL STEM EDUCATION ACT

MARKUP

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

NOVEMBER 14, 2019

Serial No. CP: 116–11

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November 14, 2019

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MARKUPS: H.R. 4704, ADVANCING RESEARCH TO PREVENT SUICIDE ACT; H.R. 4990, ELECTION TECHNOLOGY RESEARCH ACT; AND H.R. 4979, RURAL STEM EDUCATION ACT

THURSDAY, NOVEMBER 14, 2019

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Committee met, pursuant to notice, at 10:05 a.m., in room 2318 of the Rayburn House Office Building, Hon. Eddie Bernice Johnson [Chairwoman of the Committee] presiding.

Chairwoman JOHNSON. Good morning. The Committee will come to order. Without objection, the Chair is authorized to declare recess at any time. Pursuant to Committee rule 2(e) and House rule XI, the Chair announces that she may postpone roll call votes.

Pursuant to notice, the Committee meets to consider the following measures: H.R. 4704, *Advancing Research to Prevent Suicide Act*; H.R. 4990, *Election Technology Research Act*; and H.R. 4979, *Rural STEM Education Act*.

Welcome to this markup. And I think we have three excellent bills. I want to thank Representatives McAdams, Gonzalez, and Balderson for introducing our first bill we're considering, H.R. 4704, the *Advancing Research to Prevent Suicide Act*.

Suicide is a major public health concern and a leading cause of death in America. Tragically, suicide is the second-leading cause of death of young people between the ages of 10 and 34. While our understanding of suicide has increased over the last 50 years, more research is needed.

This bill directs the National Science Foundation (NSF) to support research to improve our understanding of the complex risk factors that contribute to suicidal thoughts and behavior and inform efforts to save lives. This is a critically important issue, and I thank my colleague from Utah for his efforts to address the problem.

We will next consider H.R. 4990, the *Election Technology Research Act*. A year from now, America will go to the polls to elect a President, select their Representatives in Congress, and make many other important choices at the local and State level. Transparent, fair, and secure elections are the bedrock of our democracy.

While it is human behavior that governs the integrity of elections, the technologies used in elections are a source of vulnerability.

Unfortunately, recent elections have been marred by several incidences involving outdated, malfunctioning voting machines. In addition, online voting registration databases in a number of States have been subject to attempted cyberattacks. These incidents have increased Americans' concern about the integrity of our elections.

The *Election Technology Research Act* makes critical investments at the National Institute of Standards and Technology (NIST) and the National Science Foundation to support cybersecurity research and modernization of our voting systems. I want to thank Representatives Sherrill and Gonzalez for introducing this good bipartisan bill. It is an important piece of the larger national discussion about ensuring the integrity of our elections.

The last bill we are considering today is H.R. 4979, the *Rural STEM Education Act*. I want to thank Ranking Member Lucas, Representative McAdams, and Representative Baird for introducing H.R. 4979. As Members of the Science Committee, we know that diversity in STEM (science, technology, engineering, and mathematics) is important. We need talented minds from all backgrounds at the table to ensure we can continue to innovate and compete globally.

Unfortunately, students living in rural communities are often overlooked in efforts to address STEM diversity. This legislation directs the National Science Foundation to support much-needed research and program development to help address the challenges rural communities face in providing high-quality STEM education. I urge my colleagues to support its passage out of Committee.

I look forward to considering each of these good bipartisan bills today and quickly moving them to the full House.

[The prepared statement of Chairwoman Johnson follows:]

Good morning and welcome to today's markup of what I think are three excellent bills.

I want to thank Representatives McAdams, Gonzalez, and Balderson for introducing our first bill we are considering: H.R. 4704, the *Advancing Research to Prevent Suicide Act*.

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I look forward to considering each of these good bipartisan bills today, and quickly moving them to the full House.

Chairwoman JOHNSON. I now recognize our Ranking Member, Mr. Lucas, for his opening remarks.

Mr. LUCAS. Thank you, Chairwoman Johnson, for holding this markup. Today, we'll consider three bipartisan bills.

The first is H.R. 4704, the *Advancing Research to Prevent Suicide Act*. I want to thank the bill's sponsors, Mr. McAdams and Mr. Gonzalez, for working together to address this critical issue.

Suicide was the 10th-leading cause of death in the United States in 2016, and the second-leading cause of death among people ages 10 to 34. For our Nation's veterans, it is an epidemic. We lose 17 veterans in America a day to suicide.

Despite these rising numbers, there are still major gaps in our fundamental understanding of the underpinnings of suicide and how to prevent it. According to the experts, much more research is needed to understand how people respond to stress, how social influence impacts suicide, and what makes some people more resilient than others.

This bill will support basic research at the National Science Foundation to improve our understanding of such factors. Basic research in this area will help inform better interventions and better outcomes. I urge my colleagues to support the bill.

Next, we'll consider H.R. 4990, the *Election Technology Research Act*. I am proud to join with Representatives Sherrill and Gonzalez and Chairwoman Johnson as a cosponsor of this bill. The integrity and security of elections is fundamental to democracy in the United States, and it should not be a partisan issue. This bill makes appropriate steps to update research activities at the National Science Foundation and NIST to promote the security and modernization of U.S. voting systems. The bill also establishes the Election Systems Center of Excellence at NIST to foster collaborations between NIST, universities, and State and local officials to address security challenges.

The U.S. Constitution vests the responsibility of administering elections with State and local governments. However, the Federal Government has an important role to play in providing guidance and assistance to States on election systems. The Federal Government can and should also work closely with State and local officials to deal with foreign and domestic cyber threats. This bill provides the research tools to do that without imposing costly or burdensome mandates on the States.

I appreciate Chairwoman Johnson and her staff for working with us to produce a good bipartisan bill, and I urge my colleagues to support it.

Finally, we'll consider H.R. 4979, the *Rural STEM Education Act*, a bill I introduced with Representative McAdams, Chairwoman Johnson, and Representative Baird. I'll speak more on the bill when we take it up in a few minutes.

I once again want to thank Chairwoman Johnson for holding today's markup of these three bipartisan bills, and I yield back.

[The prepared statement of Mr. Lucas follows:]

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I once again want to thank Chairwoman Johnson for holding today's markup of these three bipartisan bills, and I yield back.

H.R. 4979

Chairwoman JOHNSON. Our next bill will be H.R. 4979. The clerk will report the bill.

The CLERK. H.R. 4979, a bill to direct the Director of the National Science——

[The bill follows:]

(Original Signature of Member)

116TH CONGRESS
1ST SESSION

H. R. _____

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

Mr. LUCAS introduced the following bill; which was referred to the Committee on _____

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 (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 a 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
16 transdisciplinary teaching approach for
17 STEM disciplines;

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,
10 makerspaces, 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).

Chairwoman JOHNSON. Without objection, the bill is considered as read and open to amendment at any point.

And I recognize the Ranking Member to speak on the bill.

Mr. LUCAS. Thank you, Madam Chair. I am pleased to be leading this important bipartisan bill to improve STEM education in rural communities. I'd like to thank you, Congressman McAdams and Congressman Baird, for working with me in developing it.

H.R. 4979 continues this Committee's long bipartisan history of supporting and expanding STEM education for all. As the Members of this Committee know well, for the U.S. to remain competitive in a world economy, we must have a workforce skilled in science, technology, engineering, math, and computer science. The demand for these skills is so strong in fact that many employers are struggling to fill these open jobs.

In Oklahoma, for instance, our universities have doubled the size of their engineering programs but still can't keep up with the demand. Even after the most recent class entered the job market, there were still more than 2,000 open engineering jobs in the State. Over the next decade, the STEM shortage is anticipated to reach 1 million positions according to the Bureau of Labor Statistics. Meeting this demand starts in elementary school.

With STEM education becoming so fundamental to success in any industry, finding ways to improve the quality of STEM learning everywhere is of critical importance. Over 9 million students in the United States, nearly 20 percent of the total K through 12 population, attend rural schools. In Oklahoma, that number is even higher. One-third of our students attend rural schools. These students face a number of barriers to accessing high-quality STEM learning, including a shortage of trained science and math teachers, single teachers teaching multiple grade levels, a lack of access to advanced STEM courses, and few local university and industry partners.

The *Rural STEM Education Act* supports research and development activities at the National Science Foundation to improve our understanding of the challenges rural communities are facing in providing and sustaining quality STEM education programs and take steps to address them. This bill includes a number of provisions to provide rural educators with the tools they need to be successful. It supports opportunities for rural educators to refresh and enhance their own STEM knowledge such as computer science training or participation in research opportunities at Federal laboratories and universities. These experiences provide rural educators with high-quality STEM skills and practices they can take back to their classrooms and pass on to their students.

A major focus of the bill is broadening the participation of rural students in STEM. For example, the bill supports place-based learning. Rural students have direct access to physical sciences every day in their communities. Place-based learning connects students to the science that's right outside their doors, whether it's studying animal science out on the farm with FFA (Future Farmers of America), or learning about local ecosystems out on the prairies and in the forests. That direct experience engages students and helps them understand that STEM skills matter to everyone, not just students in white lab coats.

H.R. 4979 also helps develop best practices for accessing and using computer-based and online STEM education courses.

Finally, the bill takes steps to address one of the key obstacles to rural STEM education, reduced connectivity and particularly the lack of broadband access. Of the 21 million Americans who lack access to broadband, the majority live in rural areas. The bill directs the National Institutes of Standards and Technology to establish a prize competition to advance innovative technologies for broadband connectivity deployment in underserved rural communities. It also codifies a working group to set key research priorities for improving broadband access so many rural communities can enjoy the same connectedness as the rest of the country.

Taken together, the measures in this bill will improve rural STEM education. I believe rural areas represent one of the greatest yet underutilized opportunities for STEM education to enhance the United States future STEM workforce. I'm pleased this bill has gained the endorsement of the STEM Education Coalition, Battelle and STEMx, the National Science Teaching Association, the American Chemical Society, the Girl Scouts of the USA, Microsoft, and the Association of Public and Land-Grant Universities.

At this time, Madam Chair, I request the letters of support for H.R. 4979 I received from the Association of Public and Land-Grant Universities and the American Chemical Society be entered into the record.

Chairwoman JOHNSON. Without objection.

[The information referred to follows:]

External Affairs & Communications
Anthony Pitagno
Director

November 13, 2019

The Honorable Frank Lucas
Ranking Member, House Committee on Science, Space, and Technology
Rayburn House Office Building 2405
Washington, D.C. 20515

Dear Ranking Member Lucas:

On behalf of the American Chemical Society (ACS) and the over 150,000 member chemists and chemical engineers we represent, I write to endorse H.R. 4979, the Rural STEM Education Act. Support for students and teachers across all underserved populations will help close the gap of access and equity in Science, Technology, Engineering and Mathematics (STEM) education. The ACS promotes strengthening STEM teacher recruitment and training programs, support for facilities and hands on research experiences, and investments in research for teaching and learning in STEM.

The ACS would like to commend you for your efforts to address equity of access to high quality STEM education and STEM teacher shortages in our country. This legislation and the bipartisan collaboration to bring it to the floor speak volumes to the STEM community.

We look forward to continued collaboration with your office and to working closely with Congress to pass this important legislation. Should you have any questions, please do not hesitate to contact Lauren Posey at l_posey@acs.org.

Sincerely,

Anthony Pitagno

Anthony Pitagno

CC:
The Honorable Eddie Bernice Johnson

American Chemical Society
1155 Sixteenth Street, N.W. Washington, D.C. 20036 T [202] 872 4394 F [202] 872 6206 www.acs.org

November 14, 2019

The Honorable Frank Lucas
Ranking Member
Committee on Science, Space, and Technology
United State House of Representatives
Space, and Technology
2405 Rayburn HOB
Washington, DC 20515

Dear Representative Lucas.

As president of the Association of Public and Land-grant Universities (APLU), I write to express our support for H R. 4979, the Rural STEM Education Act. This bill will help address our nation's need for a diverse STEM workforce that is inclusive of Americans living in rural areas.

APLU is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities. Annually, APLU's 197 U.S. member campuses enroll 4 1 million undergraduates and 1 2 million graduate students, award 1 1 million degrees, employ 1.1 million faculty and staff, and conduct $42 4 billion in university-based research.

APLU members are working with rural communities across North America to improve educational options, economic vitality, and quality of life Land-grant universities, in particular, deliver trusted, science-based information and educational programs for individuals, families, and communities through their Cooperative Extension efforts

This bill works to improve access to research-based STEM education opportunities in rural schools, provide teachers with the support and tools they need to teach more effectively, and address the lack of broadband access in rural communities. All of these are necessary to ensure that more students have access to a high-quality STEM education

There is no question that rural residents and businesses need access to high-speed internet service APLU has been working closely with our members to improve digital inclusion for rural areas APLU appreciates the provisions in H R 4979 that would expand online tools for educators and establish research opportunities to address challenges and opportunities for improving broadband access across our country.

I commend you for the introduction of this important legislation and look forward to continuing to work with you throughout the legislative process.

Sincerely,

Peter McPherson
President

1307 New York Avenue NW, Suite 400, Washington, DC 20005-4722 202 478 6040 fax 202 478 6046 www aplu org

Mr. LUCAS. I again want to thank Chairwoman Johnson, Representative McAdams, Representative Baird, and their staff for working with us on this bill. I look forward to moving this bill in the House and the Senate, and I urge my colleagues to support it. And I yield back, Madam Chair.

[The prepared statement of Mr. Lucas follows:]

Thank you, Chairwoman Johnson, for holding this mark-up. Today we will consider three bipartisan bills.

The first is H.R. 4704, the *Advancing Research to Prevent Suicide Act*. I want to thank the bill's sponsors, Mr. McAdams and Mr. Gonzalez, for working together to address this critical issue.

Suicide was the 10th-leading cause of death in the United States in 2016, and the second-leading cause of death among people ages 10 to 34. For our nation's veterans, it is an epidemic. We lose 17 veterans in America a day to suicide.

Despite these rising numbers, there are still major gaps in our fundamental understanding of the underpinnings of suicide and how to prevent it. According to the experts, much more research is needed to understand how people respond to stress, how social influence impacts suicide, and what makes some people more resilient than others.

This bill will support basic research at the National Science Foundation, to improve our understanding of such factors. Basic research in this area will help inform better interventions, and better outcomes. I urge my colleagues to support the bill.

Next, we will consider H.R. 4990, the *Election Technology Research Act*. I am proud to join with Representatives Sherrill and Gonzalez and Chairwoman Johnson as a co-sponsor of this bill.

Integrity and security in elections are fundamental to democracy in the United States, and it should not be a partisan issue. This bill takes appropriate steps to update research activities at the National Science Foundation and NIST to promote the security and modernization of U.S. voting systems.

The bill also establishes an Election Systems Center of Excellence at NIST to foster collaborations between NIST, universities, and state and local election officials, to address security challenges.

The U.S. Constitution vests the responsibility of administering elections with State and local governments. However, the Federal government has an important role to play, in providing guidance and assistance to states on election systems. The Federal government can and should also work closely with State and local election officials to deal with foreign and domestic cyber threats. This bill provides the research tools to do that, without imposing costly or burdensome mandates on States.

I appreciate Chairwoman Johnson and her staff for working with us to produce a good bipartisan bill. I urge my colleagues to support it

Finally, we will consider H.R. 4979, the *Rural STEM Education Act*, a bill I have introduced with Representative McAdams, Chairwoman Johnson and Representative Baird. I'll speak more on the bill when we take it up in a few minutes.

I once again want to thank Chairwoman Johnson for holding today's markup of these three bipartisan bills, and I yield back.

Chairwoman JOHNSON. Thank you very much.

Anyone else desire to be recognized? Mr. McAdams.

Mr. MCADAMS. Thank you, Madam Chair, and thank you, Ranking Member Lucas and Representative Baird, for your leadership on this important legislation. I'm proud to be the lead Democratic sponsor of the *Rural STEM Education Act* and invest in STEM education for Utah's rural communities.

Rural school districts across my State face unique and pressing challenges to provide our students with 21st century learning opportunities and to equip teachers with the tools that they need. These issues limit our ability to support students in their future, but they also limit the ability of many Utahans who live, work, and contribute in their treasured home communities or face the choice of leaving rural Utah to pursue opportunities elsewhere. So I believe the *Rural STEM Education Act* is a needed investment in our

Nation's STEM education, but STEM education and job creation are also key to our rural communities' economic future.

Utah is home to a number of leading innovative sectors from medicine to computing to space, and employers regularly tell me that they need more talented STEM workers, and we can't fill the skills shortage without looking to the talent and potential of our students in rural areas.

In my State, partners like Utah's STEM Action Center and our colleges and universities are currently doing great work to support teachers with training programs and by developing toolkits to bring hands-on learning such as robotic experiments to classrooms across our State. I believe the *Rural STEM Education Act* builds on our current work to invest in rural communities and in our rural economies.

Thank you again, Ranking Member Lucas, for your leadership on this legislation, Representative Baird, and Chairwoman Johnson, for making STEM education a key priority of this Committee. I urge my colleagues to support this bill, and I yield back.

Chairwoman JOHNSON. Thank you.

Mr. LUCAS. And, Madam Chair, can I note——

Chairwoman JOHNSON. Any further requests for time? Ms. Horn.

Ms. HORN. Thank you, Madam Chair.

I think it's impressive we have such an important slate of bipartisan legislation that have impacts in my district.

And I want to say thank you to my fellow Oklahoman, Ranking Member Lucas, and to all of the leads on this bill. It is such a critical piece of the puzzle for economic growth and competitiveness.

Just yesterday in the Space and Aeronautics Subcommittee we heard testimony from fellow Oklahoman and Apollo astronaut General Stafford as well as Tom Young about the importance of growing our workforce in STEM education. We see that across a number of industries, and I hear that from companies across my district.

And we know that over the next decade the U.S. is expected to need at least 1 million more STEM workers than our current education pipeline can produce. Let me put it another way: Every single school day our education system is falling behind by another 500 students. The reasons for this are complex, and this bill will go a long way to addressing them. This shortfall will have long-term economic consequences not only for our economic security and competitiveness but also for our national security.

A short time ago I visited a very small school in my district in a place called Asher, 400 people in this small community. And the story they shared with me about the limits of opportunities for learning STEM education is one that can also move young people out of what they think is possible into something else. By bringing in a robotics program and having support, these young people were introduced to the possibilities of a STEM career. And that's what this bill does. In rural communities, the students face significant barriers, as have already been addressed, including a shortage of teachers and a lack of resources.

Madam Chairwoman, when we shortchange our students, we shortchange our future. And when we fail to invest in STEM education in our rural communities, we overlook students who might

be the engine for the next great discovery—unmanned aerial vehicle, engineering a better battery, and on and on.

I'm so proud to be a part of the bipartisan effort to pass the *Rural STEM Education Act* with my fellow Members here in this bipartisan way and know that students in rural communities are critical to helping us close this STEM skills gap in building our workforce and economy to move forward. Today's legislation does just that, and I urge my colleagues to join me in supporting the *Rural STEM Education Act*.

I yield back. Thank you.

Chairwoman JOHNSON. Thank you. Mr. Perlmutter.

Mr. PERLMUTTER. Thanks. I move to strike the last word.

Chairwoman JOHNSON. The gentleman is recognized.

Mr. PERLMUTTER. I thank the gentleman for bringing this bill. It's an important bill. I would be remiss. It's focused on geography, which needs to be, but I've had three groups come in in the last few weeks that would like to make it STEAM and not STEM, and STEAM being architecture. They'd like to be in there, accountancy, and it really does address the third group, which agriculture.

I think it's a great bill, I fully support it, but there are some groups out there who feel they're losing a lot of potential employees and individuals who would like to participate through these programs, and they'd like to make it STEAM. But for the time being, I support STEM and the gentleman's bill, and I yield back.

Chairwoman JOHNSON. Thank you. Any further requests for time?

We will now then proceed with the amendments in order on the roster. Our first amendment is offered by Mr. Lucas.

Mr. LUCAS. I have an amendment at the desk, Madam Chair.

Chairwoman JOHNSON. The clerk will read the amendment.

The CLERK. Amendment No. 1, amendment to H.R. 4979 offered by Mr. Lucas.

[The amendment of Mr. Lucas follows:]

AMENDMENT TO H.R. 4979

OFFERED BY M__. _____

Page 2, line 13, strike "a".

Page 9, lines 2 through 4, strike everything after "promote" and insert "the engagement and achievement of rural students in grades PreK - 12 in STEM studies.".

Page 9, line 18, insert "rural" after "of".

Page 16, line 7, strike "and".

Page 16, line 12, after "recommendations" insert "for action at the Federal, State, and local levels".

Page 20, line 9, after "key" insert "research".

Page 20, line 17, strike "potential" and insert "input on the".

Page 20, line 18, insert "to enhance data collection and research" after "programs".

☒

Chairwoman JOHNSON. I ask unanimous consent to dispose with the reading, and without objection, so ordered.

I recognize the gentleman for 5 minutes to explain his amendment.

Mr. LUCAS. Thank you, Chairwoman Johnson.

This amendment provides technical changes to the legislation, incorporates feedback from relevant stakeholders, including the National Academies and the Office of Science and Technology Policy. I want to thank the Chairwoman and her staff for working with me to incorporate these important changes. I encourage my colleagues to support this amendment, and I yield back.

Chairwoman JOHNSON. Thank you very much. Any further requests for time?

Then the vote occurs on the amendment.

All in favor, say aye.

Those opposed, nay.

The ayes have it. The amendment is agreed to.

Our next amendment is offered by Ms. Herrera Beutler.

Ms. HERRERA BEUTLER. Thank you, Madam Chair. I have an amendment at the desk.

Chairwoman JOHNSON. The clerk will report the amendment.

The CLERK. Amendment No. 2, amendment to H.R. 4979 offered by Ms. Herrera Beutler.

[The amendment of Ms. Herrera Beutler follows:]

AMENDMENT TO H.R. 4979

OFFERED BY M__. _____

Page 3, line 5, insert "computer science," after "geology,".

Page 3, line 6, insert the following new paragraph:

1 (8) It is estimated that by 2020 that there will
2 be a projected one million more computing jobs than
3 applicants who can fill them. To meet this demand,
4 rural students must acquire computing skills
5 through exposure to computer science learning in
6 grades PreK - 12 and in informal learning settings.

Page 3, line 6, strike "(8)" and insert "(9)".

Page 6, line 23, after "work" insert ", including computer science,".

Page 7, line 22, after "activities" insert ", including coding,".

Page 8, line 10, after "makerspaces," insert "coding activities,".

Chairwoman JOHNSON. I ask unanimous consent to dispose with the reading. Without objection, so ordered.

I recognize the author for 5 minutes to explain her amendment.

Ms. HERRERA BEUTLER. Thank you, Chairwoman Johnson and Ranking Member Lucas.

I'm proud to support the bill here in Committee, and when it comes before the House for consideration.

I'm also proud to offer an amendment of great importance to Washington State and my district in southwest Washington. My home is now a growing silicon forest with STEM industries making up almost 40 percent of the gross regional product. And I support this bill because it's going to help teachers and students in rural communities compete in our quickly changing economy.

The amendment I'm offering today will amend the *Rural STEM Education Act* to further highlight the importance of pre-K through 12th grade students' exposure to and engagement in computer science. It includes a finding that researchers predict by 2020 there will be more than 1 million computing jobs than applicants who can fill them. And to meet this demand, we must ensure that our students have the opportunity to gain computing skills needed to be competitive in this future economy.

Now, my amendment is going to ensure that the computer science and coding are included as eligible activities supported under this bill, so large employers like Microsoft and small startup companies alike have thousands of job openings that require the computer and coding-related skills but are struggling to fill those openings. And in fact in Washington State alone we have over 17,000 open computing jobs. It is vital our students in our rural communities can develop these skills and compete for these good-paying jobs.

My amendment ensures that the grants awarded by the National Science Foundation under this bill can be used to research and develop better teaching methods for coding and computer science skills. So I encourage all my colleagues to support my amendment. And with that, I yield back my time.

Chairwoman JOHNSON. Thank you very much.

Any further requests for time? Mr. Lucas.

Mr. LUCAS. Thank you, Chairwoman Johnson.

I'd like to thank Representative Herrera Beutler for offering this amendment, which further highlights the importance and necessity of exposure to computer science in grades pre-K through 12. We know that the number of open computer science jobs across the United States greatly outnumbers the number of computer science graduates annually, most notably in rural areas.

In Oklahoma we have over 2,000 open computer science jobs. This demand is expected to grow, and of all future jobs, an estimated 70 percent will require skills in the fields of STEM, coding, computer science, data analysis, artificial intelligence, and computer thinking.

Even farming has come to require the skills in order to utilize technology to reduce expenses and boost efficiencies. For example, artificial intelligence can help make pinpoint decisions about when to plant, when to water, how much fertilizer to use, when to harvest, and more. To meet this demand and ensure that students are

prepared for the future, rural students must acquire computer skills through exposure to computer science learning in both the classroom and informal settings.

I appreciate Representative Herrera Beutler's own work to promote STEM and computer science, which are so critical to our economy in her home State of Washington. I encourage my colleagues to support this amendment, and I yield back.

Chairwoman JOHNSON. Thank you very much. Any further requests for time?

Seeing none, then the vote occurs on the amendment.

All in favor, say aye.

Those opposed, no.

The ayes have it, and the amendment is agreed to.

The next amendment on the roster is an amendment offered by the gentleman from Utah, and Mr. McAdams is recognized to offer his amendment.

Mr. MCADAMS. Thank you, Madam Chairwoman. I have an amendment at the desk.

Chairwoman JOHNSON. The clerk will report the amendment.

The CLERK. Amendment No. 3, amendment to H.R. 4979 offered by Mr. McAdams.

[The amendment of Mr. McAdams follows:]

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AMENDMENT TO H.R. 4979

OFFERED BY MS. McAdams

Insert after section 5 the following (and make such conforming changes as may be necessary):

1 **SEC. 6. GAO REVIEW.**

2 Not later than 3 years after the date of enactment
3 of this Act, the Comptroller General of the United States
4 shall conduct a study on the engagement of rural popu-
5 lations in Federal STEM programs and submit to Con-
6 gress a report that includes—

7 (1) an assessment of how Federal STEM edu-
8 cation programs are serving rural populations;

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

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

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

Chairwoman JOHNSON. I ask unanimous consent to dispose with the reading. Without objection, so ordered.

The gentleman is recognized for 5 minutes to explain his amendment.

Mr. MCADAMS. Thank you, Madam Chair.

As I said before, the *Rural STEM Education Act* is crucial legislation that we need to reach and empower our rural students, our teachers, and communities with high-quality STEM education opportunities. My amendment is a simple one that commissions a Government Accountability Office (GAO) study within 3 years to review all Federal STEM education programs serving our rural communities.

The GAO will report on how our Federal STEM programs are serving rural populations, report on their effectiveness, and also on the challenges they face in reaching rural communities. The report would also provide a descriptive list of all Federal efforts to support rural STEM education. I believe this GAO report is a strong signal that Congress will remain committed to effectively investing in STEM education and supporting our teachers in rural communities. I urge my colleagues to support this amendment, and I yield back.

Chairwoman JOHNSON. Thank you. Any further discussion on the amendment?

Mr. LUCAS. Madam Chair?

Chairwoman JOHNSON. Mr. Lucas.

Mr. LUCAS. Thank you, Madam Chair.

I support Representative McAdams' amendment, which directs the Government Accountability Office to conduct a study to gain a clearer picture of how Federal STEM education programs are serving rural populations. It's important we have a full understanding of how the Federal Government is currently serving these communities. I encourage my colleagues to support this amendment, and I yield back.

Chairwoman JOHNSON. Thank you. Any further comments?

OK. The vote occurs then on the amendment.

All in favor, say aye.

Those opposed, nay.

The ayes have it, and the amendment is agreed to.

Are there any other amendments?

If no, a reporting quorum being present, I move that the Committee on Science, Space, and Technology report H.R. 4979, as amended, to the House with the recommendation that the bill be approved.

Those in favor of the motion will signify by saying aye.

Those opposed, no.

The ayes have it, and the bill is favorably reported.

Without objection, the motion to reconsider is laid on the table, and I ask unanimous consent that staff be authorized to make any necessary technical and conforming changes to the bill. Without objection, so ordered.

Members will have 2 subsequent calendar days in which to submit supplemental minority or additional views on the measure.

I thank everyone for being here, and our business is completed and our markups are concluded. And the Committee is adjourned.

[Whereupon, at 10:57 a.m., the Committee was adjourned.]

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