use of public and private cloud computing, including—

(1) new approaches, techniques, technologies, and tools for—

(A) optimizing the effectiveness and efficiency of cloud computing environments; and

(B) mitigating security, identity, privacy, reliability, and manageability risks in cloud-based environments, including as they differ from traditional data centers;

(2) new algorithms and technologies to define, assess, and establish large-scale, trustworthy, cloud-based infrastructures;

(3) models and advanced technologies to measure, assess, report, and understand the performance, reliability, energy consumption, and other characteristics of complex cloud environments; and

(4) advanced security technologies to protect sensitive or proprietary information in global-scale cloud environments.

(b) Establishment

(1) In general

Not later than 60 days after January 4, 2011, the Director shall initiate a review and assessment of cloud computing research opportunities and challenges, including research areas listed in subsection (a), as well as related issues such as—

(A) the management and assurance of data that are the subject of Federal laws and regulations in cloud computing environments, which laws and regulations exist on January 4, 2011;

(B) misappropriation of cloud services, piracy through cloud technologies, and other threats to the integrity of cloud services;

(C) areas of advanced technology needed to enable trusted communications, processing, and storage; and

(D) other areas of focus determined appropriate by the Director.

(2) Unsolicited proposals

The Director may accept unsolicited proposals that review and assess the issues described in paragraph (1). The proposals may be judged according to existing criteria of the National Science Foundation.

(c) Report

The Director shall provide an annual report for not less than 5 consecutive years to Congress on the outcomes of National Science Foundation investments in cloud computing research, recommendations for research focus and program improvements, or other related recommendations. The reports, including any interim findings or recommendations, shall be made publicly available on the website of the National Science Foundation.

(d) NIST support

The Director of the National Institute of Standards and Technology shall—

(1) collaborate with industry in the development of standards supporting trusted cloud computing infrastructures, metrics, interoperability, and assurance; and

(2) support standards development with the intent of supporting common goals.

(Pub. L. 111–358, title V, § 524, Jan. 4, 2011, 124 Stat. 4018.)

CODIFICATION

Section was enacted as part of the America COMPETES Reauthorization Act of 2010, also known as the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Reauthorization Act of 2010, and also as part of the National Science Foundation Authorization Act of 2010, and not as part of the National Science Foundation Act of 1950 which comprises this chapter.

DEFINITIONS

For definitions of terms used in this section, see section 502 of Pub. L. 111–358, set out as a note under section 1862p of this title.

§ 1862p–13. Tribal colleges and universities program

(a) In general

The Director shall continue to support a program to award grants on a competitive, merit-reviewed basis to tribal colleges and universities (as defined in section 1059c of title 20, including institutions described in section 1059d of title 20), to enhance the quality of undergraduate STEM education at such institutions and to increase the retention and graduation rates of Native American students pursuing associate's or baccalaureate degrees in STEM.

(b) Program components

Grants awarded under this section shall support—

(1) activities to improve courses and curriculum in STEM;

(2) faculty development;

(3) stipends for undergraduate students participating in research; and

(4) other activities consistent with subsection (a), as determined by the Director.

(c) Instrumentation

Funding provided under this section may be used for laboratory equipment and materials.

(Pub. L. 111–358, title V, § 525, Jan. 4, 2011, 124 Stat. 4019.)

CODIFICATION

Section was enacted as part of the America COMPETES Reauthorization Act of 2010, also known as the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Reauthorization Act of 2010, and also as part of the National Science Foundation Authorization Act of 2010, and not as part of the National Science Foundation Act of 1950 which comprises this chapter.

DEFINITIONS

For definitions of terms used in this section, see section 2 of Pub. L. 111–358, set out as a note under section 6621 of this title, and section 502 of Pub. L. 111–358, set out as a note under section 1862p of this title.

§ 1862p–14. Broader Impacts Review Criterion

(a) Goals

The Foundation shall apply a broader impacts review criterion to identify and demonstrate project support of the following goals:

(1) Increasing the economic competitiveness of the United States.

(2) Advancing of the health and welfare of the American public.

(3) Supporting the national defense of the United States.

(4) Enhancing partnerships between academia and industry in the United States.

(5) Developing an American STEM workforce that is globally competitive through improved pre-kindergarten through grade 12 STEM education and teacher development, and improved undergraduate STEM education and instruction.

(6) Improving public scientific literacy and engagement with science and technology in the United States.

(7) Expanding participation of women and individuals from underrepresented groups in STEM.

(b) Policy

Not later than 6 months after January 4, 2011, the Director shall develop and implement a policy for the Broader Impacts Review Criterion that—

(1) provides for educating professional staff at the Foundation, merit review panels, and applicants for Foundation research grants on the policy developed under this subsection;

(2) clarifies that the activities of grant recipients undertaken to satisfy the Broader Impacts Review Criterion shall—

(A) to the extent practicable employ proven strategies and models and draw on existing programs and activities; and

(B) when novel approaches are justified, build on the most current research results;

(3) allows for some portion of funds allocated to broader impacts under a research grant to be used for assessment and evaluation of the broader impacts activity;

(4) encourages institutions of higher education and other nonprofit education or research organizations to develop and provide, either as individual institutions or in partnerships thereof, appropriate training and programs to assist Foundation-funded principal investigators at their institutions in achieving the goals of the Broader Impacts Review Criterion as described in subsection (a); and

(5) requires principal investigators applying for Foundation research grants to provide evidence of institutional support for the portion of the investigator's proposal designed to satisfy the Broader Impacts Review Criterion, including evidence of relevant training, programs, and other institutional resources available to the investigator from either their home institution or organization or another institution or organization with relevant expertise.

(Pub. L. 111–358, title V, § 526, Jan. 4, 2011, 124 Stat. 4019; Pub. L. 114–329, title I, § 102(c), Jan. 6, 2017, 130 Stat. 2972.)

CODIFICATION

Section was enacted as part of the America COMPETES Reauthorization Act of 2010, also known as the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Reauthorization Act of 2010, and also as part of the National Science Foundation Authorization Act of 2010, and not as part of the National Science Foundation Act of 1950 which comprises this chapter.

AMENDMENTS

2017—Subsec. (a). Pub. L. 114–329 amended subsec. (a) generally. Prior to amendment, text read as follows: ''The Foundation shall apply a Broader Impacts Review Criterion to achieve the following goals:

''(1) Increased economic competitiveness of the United States.

''(2) Development of a globally competitive STEM workforce.

''(3) Increased participation of women and underrepresented minorities in STEM.

''(4) Increased partnerships between academia and industry.

''(5) Improved pre-K–12 STEM education and teacher development.

''(6) Improved undergraduate STEM education.

''(7) Increased public scientific literacy.

''(8) Increased national security.''

DEFINITIONS

For definitions of terms used in this section, see section 2 of Pub. L. 111–358, set out as a note under section 6621 of this title, and section 502 of Pub. L. 111–358, set out as a note under section 1862p of this title.

§ 1862p–15. Twenty-first century graduate education

(a) In general

The Director shall award grants, on a competitive, merit-reviewed basis, to institutions of higher education to implement or expand research-based reforms in master's and doctoral level STEM education that emphasize preparation for diverse careers utilizing STEM degrees, including at diverse types of institutions of higher education, in industry, and at government agencies and research laboratories.

(b) Uses of funds

Activities supported by grants under this section may include—

(1) creation of multidisciplinary or interdisciplinary courses or programs for the purpose of improved student instruction and research in STEM;

(2) expansion of graduate STEM research opportunities to include interdisciplinary research opportunities and research opportunities in industry, at Federal laboratories, and at international research institutions or research sites;

(3) development and implementation of future faculty training programs focused on improved instruction, mentoring, assessment of student learning, and support of undergraduate STEM students;

(4) support and training for graduate students to participate in instructional activities beyond the traditional teaching assistantship, and especially as part of ongoing educational reform efforts, including at pre-K–12 schools, and primarily undergraduate institutions;

(5) creation, improvement, or expansion of innovative graduate programs such as science master's degree programs;

(6) development and implementation of seminars, workshops, and other professional development activities that increase the ability of graduate students to engage in innovation, technology transfer, and entrepreneurship;