

To: House Committee on Science, Space, & Technology  
From: The American Geophysical Union  
Date: 17 July 2020  
Subject: Input on NSF Reauthorization Act of 2020 Discussion Draft

Overall, the American Geophysical Union (AGU) wishes to thank and applaud the Committee for crafting an overwhelmingly positive and future-looking bill to authorize the National Science Foundation (NSF), and we very much appreciate the chance to comment on some of the specifics of the legislation.

#### **Sec. 4. Authorization of Appropriations**

AGU applauds the bill for providing significant increases in funding for NSF's research activities, graduate research fellowships, the U.S. Global Change Research Program, mid-scale infrastructure, and convergence research.

AGU has concerns about the funding balance the bill suggests between NSF's current directorates and the newly proposed directorate devoted to convergence research. Each year, NSF receives \$3 billion worth of high-quality research proposals that it cannot fund. Despite the significant increase to NSF's research activities in the bill, NSF will still have a large pool of worthy research that will not be funded and that may not qualify for the new funding provided under the convergence directorate.

#### **Sec. 5. STEM Education & Workforce Training**

AGU applauds the bill for including language to improve K-12, undergraduate, and graduate STEM education because meeting our nation's STEM workforce needs will require improving every part of the STEM pipeline. Additionally, AGU appreciates the support and increased funding for the Graduate Research Fellowship, which is critical to building the next generation of STEM professionals and innovators. AGU appreciates the attention paid both to the geoscientists who will pursue a career in academia and the STEM professionals who will not need four-year degrees. As such, AGU applauds both the language emphasizing professional development and mentoring as part of graduate STEM education and the focus on technical education.

AGU also values the support for the National Center for Science and Engineering Statistics to capture more robust diversity and harassment and discrimination data. Sufficient data is critical to understating the state of science, including the barriers and obstacles to entering and staying in STEM.

AGU recommends that the language in subsection (c)1(B) be more specific and changed from "varied career options" to "academic and non-academic options."

#### **Sec. 6 Broadening Participation**

AGU deeply appreciates the inclusion in the bill of sections from the Combatting Sexual Harassment in Science Act and the STEM Opportunities Act.

AGU also appreciates the bill's holistic approach to broadening participation in STEM by requiring inclusion and diversity metrics for major facility awards and the creation of a national INCLUDES initiative to develop networks and partnerships to expand effective practices in broadening participation.

In subsection (e) Support for Increasing Diversity Among STEM Faculty at Institutions of Higher Education, AGU recommends that the tenure and promotion (TAP) process be specifically targeted for research in addition to the other activities eligible for grants on this subsection. TAP has problems akin to those of the mentor/mentee relationship, and it might spur research in this area if it is specifically called out.

AGU also urges the committee to consider including the Rural STEM Education Act in the bill. For the United States to address its 1 million STEM worker shortage, it will be imperative for the U.S. to engage all citizens, including rural citizens who currently are highly disengaged from STEM. The Rural STEM Education Act could play a major role in addressing that lack of engagement.

## **Sec 7. Fundamental Research**

AGU applauds the bill's update to the report, "On Being a Scientist: A Guide to Responsible Conduct in Research," including provisions on how to address and mitigate the negative impact of harassment.

AGU applauds the bills sections on data management plans and open repositories. In requiring award winners to properly archive and preserve their data, we encourage the bill to specify that funding will be provided for grantees to carry out these activities. In shaping federal science agency data management plans, AGU urges the Committee to consider [AGU's position statement on data](#).

On page 44, section (e) – add in reference concerning digital information about physical samples as well as digital outputs in general. There are more formats than what is listed created and used in the research community (e.g. video, images, audio) and they need to be included. For example, change "facilitate the public access to research products, including data, software, and code, developed..." to "facilitate the public access to research products, including data, software, code, digital information of physical samples, and other digital outputs developed..."

On page 44, section (3)(1)(B)(i) – expand this paragraph to include training of researchers and Principal Investigators. It is important for researchers to fully understand what is expected. In this way they will more likely create a well prepared data management plan. For example,

change “resources and training necessary to review the quality of data management plans;” to “resources and training necessary to review the quality of data management plans; and ensure researchers and Principle Investigators have resources and training necessary to prepare exemplary data management plans and manage their grants to fulfill their stated objectives;”

On page 46, section (3)(C) – add in a reference to “techniques” as well as “supporting metadata.” By adding the word “technique” you expand the scope from just references to technology to include processes that are manual or more people-oriented. By adding the word “supporting metadata” you include the important documentation about the digital object. For example, change “computational methods and tools to improve the quality of data and code to produce” to “computational methods, tools, and techniques to improve the quality of data, code, and supporting metadata to produce”

Additionally, AGU approves of the direction to the Foundation to fund a program dedicated to furthering climate change research, food-energy-water systems research, and risk and resilience.

## **Sec. 8. Research Infrastructure**

AGU appreciates that the Committee is exploring ways to help NSF balance its portfolio of facilities that the agency funds and manages, and AGU supports the Facility Operation Transition pilot program. We also appreciate the language on advanced computing and the creation of a roadmap to guide NSF, given the increasing importance and need for advancing computing across all STEM fields.

## **Sec. 9. Directorate for Convergence Research & Innovation**

AGU appreciates the inclusion of a directorate dedicated to convergence research and innovation that will provide resources and funding opportunities for scientists to pursue convergence research. We also appreciate that the directorate is modeled after other NSF directorates, including the establishment of an Assistant Director position and advisory committees to guide the new directorate. Additionally, AGU appreciates the funding protections created to ensure NSF’s traditional core research and programs are not negatively impacted by the creation of a new directorate.

Although AGU supports the “Focus Areas” identified in this section, we would like to flag how these areas will evolve in the future, that the term “national importance” is not defined,” and that more consideration needs to be given to what process will be used to evaluate these areas will evolve in the future.