

March 14, 2021

The Honorable Chuck Schumer  
Majority Leader  
U.S. Senate  
Washington, D.C. 20510

The Honorable Mitch McConnell  
Minority Leader  
U.S. Senate  
Washington, D.C. 20510

Statement on Endless Frontier Act by former NSF directors and NSB chairs

Dear Majority Leader Schumer and Minority Leader McConnell:

We applaud efforts to strengthen American competitiveness in science, technology and innovation by significantly increasing support for research through the bipartisan, bicameral Endless Frontier Act, co-sponsored by Senators Chuck Schumer, D-NY, and Todd Young, R-IN, and Representatives Ro Khanna, D-CA, and Mike Gallagher, R-WI.

The draft legislation links investment in science, research and innovation with economic security. It emphasizes that inventing, growing and deploying the key technologies that can derive from investment in fundamental research is key to remaining a world leader. It also notes that our nation now ranks 10th in “research intensity,” or R&D investment as a fraction of GDP.

Recent policy reports and editorials emphasize the urgency of responding to technological competition from China and other nations whose research intensity profile is higher. As summarized in one such report by the American Academy of Arts and Sciences and Rice University’s Baker Institute for Public Policy<sup>1</sup>, this will require significant growth in federal funding for research and development, especially fundamental research. It will also require changes in the R&D budget process to allow for long-term planning; streamlining or elimination of burdensome regulations to increase research productivity; significant growth of a diverse, inclusive STEM workforce; transformation of pre-K-12 education; and a stronger partnership among federal agencies, universities, and industries.

The Endless Frontier Act proposes that the Federal Government can catalyze U.S. innovation by boosting fundamental research investments to spur commercial application. The Act calls for spreading innovation sector jobs across the nation to ensure U.S. leadership in the industries that will shape our future. The Act addresses the need for increased investment, new partnerships, improvements in STEM education and workforce training by proposing a larger role for the National Science Foundation (NSF).

As former NSF directors and National Science Board Chairs with decades of government experience, we are supportive of the spirit of this legislation. We understand that conversations are ongoing and will continue to address important details in this legislation, so we do not wish to elaborate on those details here. We are confident that NSF can meet the goals of this proposed legislation and deliver the expected outcomes if given sufficient resources and discretion in implementation.

We do want to note that the broad mission of the agency has allowed it to adapt quickly to change and challenges over the decades. For example, as the fields of computer science and engineering emerged and -- in the same time frame -- as demands by many researchers for high performance computing grew rapidly, NSF created a new directorate, “Computing and Information Science and Engineering (CISE),” along with the supercomputer network and NSFnet (adapted from ARPAnet) to connect researchers with the NSF supercomputers. NSFnet evolved into

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<sup>1</sup> American Academy of Arts & Sciences and Rice University’s Baker Institute for Public Policy, *The Perils of Complacency: America at a Tipping Point in Science and Technology*, <https://www.amacad.org/publication/perils-of-complacency>

the internet of today. And a small web browser research project, funded by an NSF grant, became Google, with a more than 300 thousand-fold return on investment.

For more than three decades, NSF has founded a number of transdisciplinary research organizations that involve collaboration with industry, starting with Engineering Research Centers, Industry-University Cooperative Research Centers, Science and Technology Centers, Materials Research Science and Engineering Centers and more recently with the initiation of Artificial Intelligence and Quantum Research Institutes.

NSF has also invented new mechanisms to ensure that discoveries with potential commercial applications are accessible to industry and that students who are interested in careers in the private sector gain experience working with scientists and engineers in industry. The National Science Foundation's Innovation Corps (I-Corps) was created in 2011 with a stated purpose "to reduce the time and risk associated with translating promising ideas and technologies from the laboratory to the marketplace." In 2017, expansion of I-Corps was authorized in the American Innovation and Competitiveness Act, leading to the creation of the National Innovation Network, consisting of I-Corps Hubs across the nation. Two years ago NSF started a unique "Convergence Accelerator" to accelerate the transition of research to the marketplace with interdisciplinary teams of industry and university researchers focused on meeting societal challenges.

We note that basic research is increasingly coupled to applications that respond to national needs. We note too that the timescale between research discovery and delivery of its application to the marketplace is necessarily shorter. It is increasingly important that the pathbreaking discoveries and inventions happen on U.S. soil. Our nation is urgently challenged by global competitors to gain preeminence in the industries that will power the future. The Endless Frontier Act would position NSF to take up that challenge. As we have outlined here, over its history NSF has responded with imagination and innovation to national challenges with leadership, new directions and new programs. The Endless Frontier Act will allow NSF to amplify the ability of our scientists and engineers to make the breakthroughs that assure our world leadership in science and technology if given the necessary flexibility and funding.

We appreciate your consideration of our views and would welcome the opportunity to discuss these matters further with you.

**Former NSF Directors**

France Cordova (2014 – 2020)



Subra Suresh (2010 – 2013)



Arden Bement (2004 – 2010)



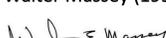
Rita Colwell (1998 – 2004)



Neal Lane (1993 – 1998)



Walter Massey (1991 – 1993)



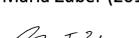
Richard Atkinson (1976 – 1980)  
(approved)

**Former NSB Chairs**

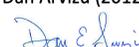
Diane Souvaine (2018 – 2020)



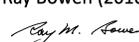
Maria Zuber (2016 – 2018)



Dan Arvizu (2012 – 2016)



Ray Bowen (2010 – 2012)



Warren Washington (2002 – 2006)



Richard Zare (1996 – 1998)



James Duderstadt (1991 – 1994)

