



December 4, 2020

The Coalition for National Science Funding (CNSF) is an alliance of more than 130 professional organizations, scientific societies, universities, and businesses united in our advocacy for the National Science Foundation (NSF). CNSF supports the goal of increasing the national investment in NSF's research and educational programs in response to the scientific, technological, and economic challenges facing the United States. CNSF appreciates the opportunity to submit the following policy and key personnel recommendations to President-elect Biden and the transition team.

NSF plays a key role in advancing all four priorities identified by the Biden Administration: sparking innovation that will be central to long-term economic recovery, supporting critical research in the battle against the COVID-19 pandemic and the related social and education consequences the pandemic has wrought, progressing racial equity and justice especially as it relates to broadening participation in STEM fields, and funding research and technology development to adapt to and combat climate change.

Policy Recommendations

Robust and Sustainable Federal Funding for Scientific Research

The United States faces enormous hurdles to overcome the COVID-19 pandemic and rebuild our economy and society for a sustainable and just future. Science, innovation, and technology are foundational to meeting these goals, yet federal research funding is insufficient to effectively address today's challenges. The Biden Administration should prioritize dramatic investments in federal research agencies and look to build out our science and technology capacity as the cornerstone of future economic growth. It is essential that early investments are followed by robust and sustainable funding to enable long-term stability in our innovation ecosystem.

The NSF budget has received only modest increases in recent years, barely keeping up with inflation. This stagnant funding puts the United States at a significant disadvantage as we work to address national challenges and compete globally. Furthermore, funding shortfalls have resulted in high demand for limited funding. Year after year, thousands of high-quality grant proposals go unfunded. A 2019 National Science Board report stated that in fiscal year 2018,

“approximately \$3.4 billion was requested for declined proposals that were rated ‘Very Good’ or higher in the merit review process.” The U.S. is leaving potentially transformative scientific research by the wayside, in all areas of science, engineering, and education. Furthermore, the COVID-19 pandemic has greatly impacted the NSF research community, setting back critical projects, and hampering STEM workforce pathways. We understand that NSF has internally estimated needing \$3 billion to recover from the impacts of the pandemic.

Now is the time to set a trajectory that will put the nation back on a path to ensure not only economic recovery from the pandemic, but also to build a flourishing manufacturing economy, achieve advancements in green energy, and create lifesaving medical advances. ***The Coalition asks that the Biden Administration propose a bold budget for NSF in fiscal year (FY) 2022.***

NSF and COVID-19: Rapid Response and Ongoing Need

NSF proved its mettle by rising to the challenge of the COVID-19 pandemic, even as it operated under interim leadership while the nomination of Dr. Panchanathan to lead the agency was pending. Using the infusion of funds appropriated by Congress as part of the CARES Act, NSF quickly activated the RAPID grant mechanism, and delivered funding promptly to investigators. The proposals that NSF selected have already made outstanding contributions in understanding and combating the pandemic. Awards have supported timely, broadscale data collection efforts and investigated issues such as community transmission, excess mortality, medical workforce capacity, and the development of new technologies to measure airborne viral exposures. While the RAPID investment enabled time sensitive funding to address urgent pandemic needs, additional research questions remain. In particular, NSF plays a primary role supporting research to understand the foundational biology of emerging diseases and their evolution, innovations in modeling for understanding pandemic dynamics, social and behavioral aspects of the pandemic that will be instrumental to building our resilience and enabling an effective response, and engineering new technologies to address many aspects of the pandemic and the resilience gaps it has exposed in our manufacturing and supply chains. The pandemic has also challenged our education ecosystem, and NSF plays a critical role supporting research to understand the impacts of virtual learning, developing new learning technologies and methods, and ensuring we do not lose a generation of future STEM researchers.

CNSF commends NSF for its nimble response and contributions toward combating the pandemic. NSF has provided important flexibility for grantees by offering extensions and modifications to award contracts. Nevertheless, the protracted nature of the pandemic has inflicted great harm—both financial and operational—on many research institutions and individual scientists. Researchers and research institutions need additional funding to remain viable and sustain ongoing research projects, infrastructure, and a trained workforce. Congress

has recognized the severity of the situation with the introduction of legislation such as the RISE Act (Research Investment to Secure the Economy Act, H.R. 7308/S. 4286) and the House's inclusion of roughly \$3 billion in funding for NSF in pending COVID-19 relief legislation. As of this writing, action on further COVID-19 relief during the transition remains uncertain. ***CNSF recommends that the new Administration champion research relief funding to the federal agencies, including NSF, as soon as possible.***

NSF Support for Physical Infrastructure Enables New Discoveries

Whether through the construction of groundbreaking telescopes, delivering the future of high-performance computing infrastructure, or pioneering fundamental physics experiments, NSF's facilities are the bedrock of many scientific disciplines. In recent years, NSF has responded to the National Science Board and the science community to expand and develop programs for research infrastructure at all levels of scale. Support for "midscale" infrastructure offers potentially transformative advances in areas such as data science that can strengthen multi-disciplinary, convergent initiatives. NSF could also play a significant role, as it did in previous economic recovery periods, in investing in academic research facilities modernization. In addition, NSF supports workforce development and supports research central to sustainable and smart community and national infrastructure. As the Biden Administration looks to rebuild American roads, bridges, water and communications infrastructure, ***CNSF encourages the new Administration to demonstrate a commitment to the health of existing major research facilities, address midscale, user facilities, and other academic research needs to enable exceptional research and education activities, and increase funding for infrastructure research and workforce development.***

Racial Equity, Broadening Participation, and Workforce

Addressing both racial equity and broadening participation is vital for the U.S. to remain a science and innovation leader. National challenges ahead will be best served by engaging all future STEM learners and workers, especially those from traditionally underrepresented groups. NSF STEM education programs work to meet the needs of all learners and to support undergraduate and graduate education efforts at Minority Serving Institutions (MSIs) and other institutions that serve students often underrepresented in STEM. However, there is more work to be done. NSF needs to make progress on increasing research capacity at MSIs through direct funding and partnerships with research universities as well as ensuring faculty diversity at a broad array of institutions by building on successful existing programmatic models.

Our ability to remain a leader in science and innovation moving forward will rely on the nation's increasingly diverse talent. NSF's programs aid this effort but must be dramatically expanded to address these major national needs.

A central aspect of NSF's mission is "to achieve excellence in STEM education at all levels and in all settings (both formal and informal) to support the development of a diverse and well-prepared workforce." NSF education research and workforce programs have a key role to play in ensuring that our nation's workers have the skills they need to thrive in the economy of the future. The Administration should also seek to build stronger partnerships between NSF and the Department of Education to ensure scaling and implementation of new education innovations.

CNSF encourages the new Administration to prioritize this critical piece of NSF's mission through support for programs that foster improvement in STEM learning and teaching, help prepare the next generation of STEM professionals, and increase the participation of women and traditionally underrepresented populations in STEM fields and the scientific and technical workforce.

Climate Change

As the nation confronts the long-term challenge of climate change, foundational research will be critical to fully understand our changing Earth and its fragile ecosystems, advance social and behavioral science central to all mitigation and adaptation efforts, catalyze new solutions through engineering and the physical sciences to increase resilience and enable clean technology, advance modeling and AI approaches to improve our forecasting abilities, and much more. NSF has many programs and initiatives of relevance to climate change, environmental sustainability, and natural disasters across all areas of science and engineering. In addition to the research, we must build a future workforce for climate and clean energy innovation, and NSF investments in education and workforce development play a key role in meeting these needs. ***CNSF urges the Biden Administration to ensure NSF is a robust part of the climate change agenda and build new partnerships between NSF and environmentally-focused agencies to ensure robust pathways from research to operations and for operations to inform new research challenges.***

A Balanced Approach Between NSF's Core Programs and New Innovative Ideas

As the only federal agency dedicated to supporting fundamental research in all disciplines, it is important that NSF continue to carry out its mission through a balanced portfolio that provides opportunities in all fields of science and engineering. NSF also has major opportunities to advance Biden Administration priorities as noted above. The CNSF membership is excited about

new Director Panchanathan’s vision to advance NSF’s work at greater scale, strength, and speed, as well as his demonstrated commitment to deepening robust partnerships with all types of stakeholders. *CNSF encourages the new Administration to support critical priority research areas at NSF while also ensuring broad funding for NSF’s core activities that fuel scientific innovation and economic growth. We also encourage the Administration to support processes at NSF that continue to provide community input into the development of new priorities for the agency.*

Key Personnel Recommendations

Early Appointment of the Science Advisor and Assistant to the President for S&T

Given the COVID-19 pandemic, it is more important than ever for the new Administration to quickly appoint a Presidential Science Advisor. Furthermore, that individual should be visible and engaged throughout the pandemic response and recovery process and highlight the important and continued role of NSF in advancing science that addresses current challenges and promotes future innovations. The advisor should have an established relationship with the stakeholder community, including Congress, industry, academia, and scientific organizations.

Since its establishment in 1976, OSTP has been tasked with providing the President and senior executive branch staff with “accurate, relevant, and timely scientific advice on all matters.” It has also “ensured that executive branch policies are based on sound science” and that the “scientific and technical work of the executive branch is coordinated to provide the greatest benefit to society.” *CNSF encourages President-elect Biden to appoint a science advisor by early January 2021 and nominate that person to serve as Director of OSTP.*

Expeditious Nomination of a Deputy Director for the National Science Foundation

NSF has been without a Senate-confirmed Deputy Director since 2013. As a new Director of NSF, Dr. Panchanathan would benefit from the support of a deputy who can help advance his vision for the agency with a focus on operations and implementation—in line with most other federal agencies, including the National Institutes of Health. *CNSF recommends that the Administration expeditiously nominate an individual for the Deputy Director position.*

American Anthropological Association
 American Association for the Advancement
 of Science
 American Association of Geographers
 American Association of Physicists in
 Medicine (AAPM)
 American Association of Physics Teachers
 American Astronomical Society
 American Chemical Society
 American Educational Research Association
 American Geophysical Union
 American Institute of Biological Sciences
 American Institute for Medical and
 Biological Engineering (AIMBE)
 American Institute of Physics
 American Mathematical Society
 American Physical Society
 American Physiological Society
 American Political Science Association
 American Psychological Association
 American Society for Microbiology
 American Society of Agronomy
 American Society of Civil Engineers
 American Society for Engineering
 Education
 American Society of Mechanical Engineers
 American Society for Pharmacology and
 Experimental Therapeutics
 American Society of Plant Biologists
 American Sociological Association
 American Statistical Association
 Arizona State University
 Association for Psychological Science
 Association for Women in Mathematics
 Association for Women in Science
 Association of American Medical Colleges
 Association of American Universities
 Association of Public and Land-grant
 Universities
 Battelle
 Biophysical Society
 Boise State University
 Boston University
 Brandeis University
 Brown University
 California Institute of Technology
 Cavarocchi Ruscio Dennis Associates
 Coalition for Academic Scientific
 Computation
 Computing Research Association
 Consortium of Social Science Associations
 Cornell University
 Council of Graduate Schools
 Council on Undergraduate Research
 Crop Science Society of America
 Duke University
 Eastman
 Ecological Society of America
 Entomological Society of America
 Eversole Associates
 Federation of Associations in Behavioral &
 Brain Sciences
 Federation of American Societies for
 Experimental Biology
 Florida State University
 Forge Policy Solutions
 Geological Society of America
 George Mason University
 Georgia Institute of Technology
 Hampton University
 Incorporated Research Institutions for
 Seismology (IRIS)
 Indiana University
 Lehigh University
 Lewis-Burke Associates LLC
 Linguistic Society of America
 Massachusetts Institute of Technology
 Mathematical Association of America

Michigan State University	The Optical Society
Michigan Technological University	Tufts University
Mineralogical Society of America	UCLA
Museum of Science, Boston	UNAVCO
National Association of Marine Laboratories	University of California System
National Communication Association	University of Cincinnati
National Postdoctoral Association	University of Colorado Boulder
National Science Teachers Association	University of the District of Columbia
New York University	University of Florida
Northeastern University	University of Illinois System
Northern Illinois University	University of Iowa
Northwestern University	University of Maryland, College Park
OSA-The Optical Society	University of Michigan
Penn State University	University of Nebraska
Population Association of America/ Association of Population Centers	University of Oklahoma
Princeton University	University of Pennsylvania
Psychonomic Society	University of Pittsburgh
PsySiP: Psychology of Science in Policy	University of Virginia
Purdue University	University of Wisconsin-Madison
Research!America	US Ignite
Rutgers, The State University of New Jersey	Vanderbilt University
SACNAS	Verizon
SAGE Publishing	Washington State University
Society for American Archaeology	West Virginia University
Society for Industrial and Organizational Psychology	Woods Hole Oceanographic Institution
Society for Neuroscience	Yale University
Society for Research in Child Development	
Society for the Psychological Study of Social Issues (SPSSI)	
Soil Science Society of America	
SPIE	
St. Louis University	
State University of New York System (SUNY)	
Stevens Institute of Technology	
Stony Brook University	
The Ohio State University	