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