American Rescue Plan & COVID-19 Response Update

Updated March 21, 2022

FACTS

$413,351,149
ARP Research Recovery Funds Mobilized

1,329 Awards Funded

OVERVIEW

As part of the national effort to recover from the COVID-19 pandemic, the National Science Foundation (NSF) continues to fund important research as well as recovery efforts to help the United States science, engineering and STEM education communities rebound. From equipment delays and reagent shortages to lost training time and missed field research, the pandemic has strained research projects in unique ways. With the continued support from Congress and the Administration, including the $600 million provided in the American Rescue Plan, NSF is able to support groups of individuals and institutions most strongly affected by the pandemic as well as those at vulnerable transition points in their research careers.

The funds are being invested consistent with the below guiding principles:

MOST STRONGLY AFFECTED GROUPS. The pandemic has exacerbated existing disparities and has had disproportionate impacts on specific groups of individuals. These strongly affected groups include:

- Women researchers, who have disproportionally taken on the duties associated with increased child-care and other family-related responsibilities.
- Underrepresented groups. Programs that support these students and researchers have been subject to disruption due to the pandemic.
- Early-career faculty. The early part of a research career represents a critical time for research productivity, building and funding a research program, and preparing for potential tenure and promotion.

INDIVIDUALS AT VULNERABLE CAREER TRANSITION POINTS. It is well established that attrition from STEM or higher education altogether frequently occurs at certain educational and career transition points, and the pandemic has intensified this threat. These individuals/transition points include:

- Undergraduates preparing to finish their degrees and attend graduate school.
- Graduate students, particularly those nearing the end of their research careers.
- Postdoctoral fellows, research trainees, and graduate fellows.
- Early career faculty.
- Mid-career faculty, who are often called upon to do greater service in light of pandemic impacts.

BROAD DISTRIBUTION. To ensure a broad distribution of funding and in further pursuit of the funds reaching those most impacted by the pandemic, NSF is using these funds towards an expansive research portfolio that prioritizes disproportionately affected persons at every institution as well as all persons at disproportionately affected institutions, such as:

- Minority-serving and less-affluent institutions, which may lack strong research administration infrastructure or the financial resources to support STEM students and faculty.
- Institutions in EPSCoR jurisdictions, which have not benefited from robust federal funding yet support a significant number of STEM students and faculty across the nation.

AWARDS

	American Rescue Plan funds	Research Recovery (FY21 +FY22)	COVID-19 Research (CARES Act + FY20 + FY21 + FY22)
Number of Awards	1,329	2,763	1,302
Funding Deployed	$413,351,149	$626,810,292	$245,308,200
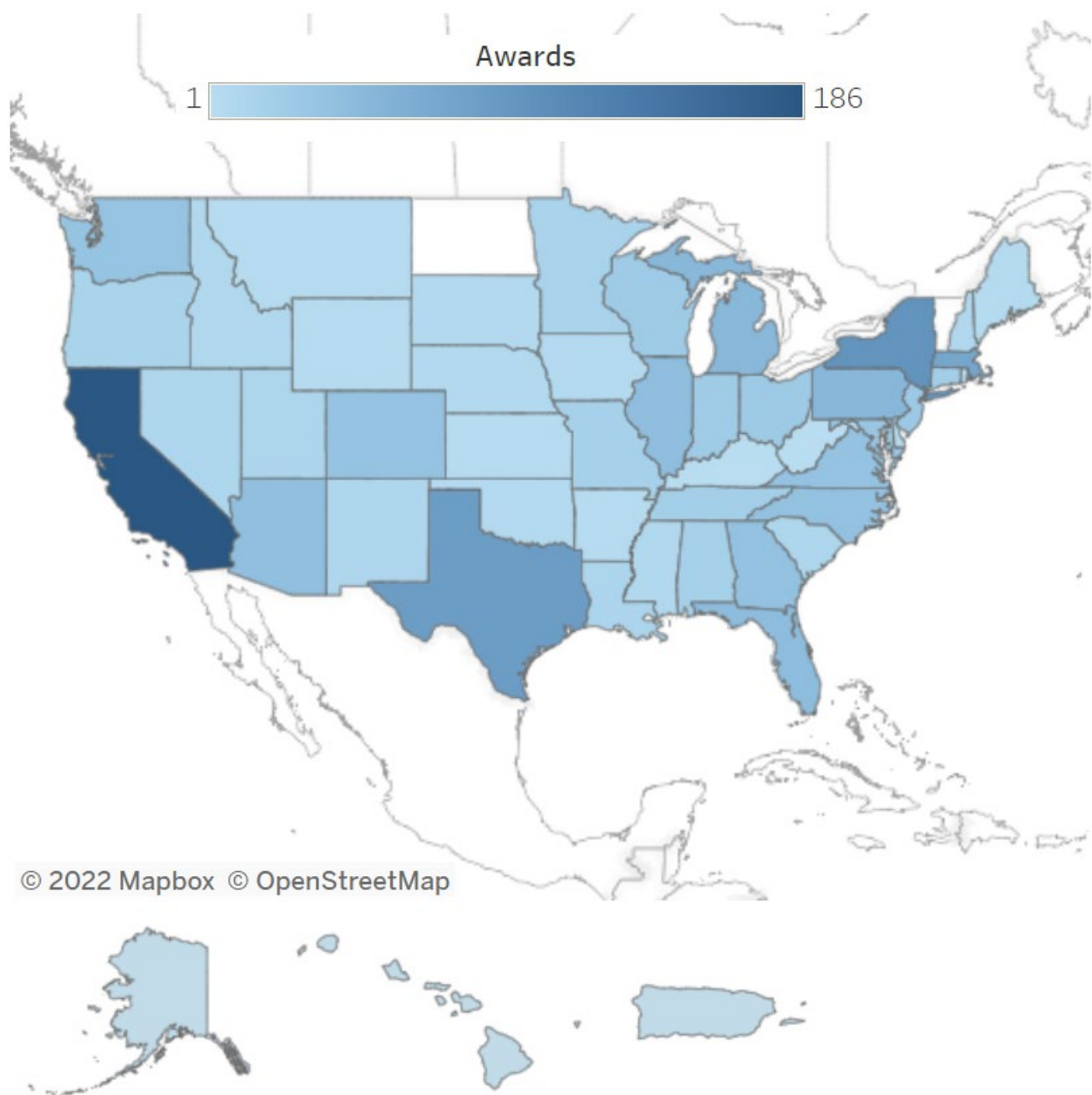
ARP awards by state

NSF Support

This update spotlights recent awards funded by the American Rescue Plan and research programs stood up by NSF to support the scientific research community. It is a snapshot of the essential research and support NSF is able to invest in thanks to the support from Congress and the Administration.

NSF PROGRAM FEATURE

NSF's Build and Broaden program supports minority-serving institutions during the pandemic and beyond

American Rescue Plan funds and FY 2021 appropriations

The COVID-19 pandemic has posed significant challenges to the U.S. research community and has disproportionately affected individuals from historically underrepresented groups in science as well as many minority-serving institutions. Minority-serving institutions — such as historically Black colleges and universities, Hispanic-serving institutions and tribal colleges and universities — educate millions of Americans, including many who will go on to join the U.S. science and technology workforce. Continued support for researchers, students and staff at those institutions is essential as the nation recovers from the pandemic.

Led by NSF's Directorate for Social, Behavioral and Economic Sciences, the Build and Broaden program supports transformative research, training opportunities and new research infrastructure at minority-serving institutions (MSIs) throughout the country. The program supports the growth of research capacity at MSIs with an emphasis on broadening participation in the social, behavioral and economic sciences. Build and Broaden is designed to increase proposal submissions from scientists at MSIs and advance new research collaborations between scientists at MSIs and other institutions across the U.S.

American Rescue Plan funding has provided nearly half of the more than $12 million NSF invested in its Build and Broaden program in fiscal year 2021. Those funds directly supported institutions and researchers who were impacted particularly hard by the COVID-19 pandemic including 20 minority-serving institutions in 12 states and Washington, D.C.

Build and Broaden currently supports more than 100 researchers as they examine a wide range of critical scientific topics focusing on society, people and the economy: from understanding the long-term health effects of poor air quality in under-resourced communities to revealing the complex memory-storage architecture of the human mind. The supported institutions will collectively provide hands-on training and educational opportunities to more than 1,000 participants, including hundreds of STEM students. In addition to conducting original research, many of the MSIs will collaborate with other institutions, including larger research-intensive universities. These collaborations are intended to foster enduring partnerships that will amplify the value and impact of fundamental research and expand the nation's STEM pipeline.

AWARD HIGHLIGHTS

DIVISION OF PHYSICS
American Rescue Plan $229,706

Title   LEAPS-MPS: Experimental Nuclear Structure Studies

Institution   South Carolina State University; Orangeburg, SC

Research & Recovery   Led by researchers at South Carolina State University, this award will fund a research program in fundamental nuclear structure physics. Researchers will investigate the structure of neutron-rich nuclei with mass numbers near 165 and so-called mirror nuclei with mass numbers near 70 that do not exist naturally in nature but can be produced at an accelerator facility. Understanding these nuclei is important for advancing knowledge of the process by which nucleons (protons and neutrons) organize into nuclei and what patterns (prolate, oblate or triaxial) emerge from those organizations. The project will enhance understanding of basic questions in physics by accelerating nuclei to high energies or angular momentum and measuring gamma- and beta-particle radiation that is emitted when they interact with other atomic nuclei. Experiments will be performed using state-of-the-art instruments and accelerator facilities in the United States. The research activities will involve South Carolina State University undergraduate students, where the student population is 93% African American and 55% female. Participation in this research will prepare and motivate minority students to continue their studies to graduate school or enter the workforce in STEM fields. Students will not only advance their professional skill set and become better scientists, but they will also be exposed to diverse areas such as national nuclear facilities, government laboratories, and medical diagnostic and treatment facilities.

This award not only supports cutting edge research in fundamental nuclear structure physics, but also supports a faculty member and students at a minority-serving institution, thereby recruiting and retaining underrepresented undergraduate students which have been disproportionally affected by the pandemic.

DIVISION OF MATERIALS RESEARCH

American Rescue Plan $800,000

Title   PREM: Collaborative Research and Education in Energy Materials (CREEM)

Institution	North Carolina Agricultural and Technical State University; Greensboro, NC
Research & Recovery	The Partnership for Research and Education in Materials (PREM) Seed awards provide funds and mentorship through a close engagement with MPS/DMR Program Directors to minority-serving institutions (MSIs). Targeting MSIs that have not had a full six-year PREM award, the Seed awards aim to spark the creation and sustainment of partnerships that will position these MSIs to become competitive for the next full PREM competition, and at the same time create a multi-institutional operational framework that builds research capacity and supports diversity in STEM. North Carolina Agricultural and Technical State University is a large public HBCU and leads the nation in numbers of undergraduate, masters, and doctoral engineering degrees awarded to African Americans. The University is also the leading producer of African American female engineers at the baccalaureate level. The aim of the NSF PREM Seed between NCAT and the Cornell Center of Materials Research, an NSF Materials Research Science and Engineering Center at Cornell University is to broaden the participation of underrepresented minority students and faculty members in renewable energy research and to create opportunities for graduate studies in materials research at NCAT and Cornell. Providing clean and renewable energy is among the most critical challenges of the 21st century. Overcoming the energy challenge requires new conversion technologies that can meet the growing global energy demand. This PREM Seed includes innovative concepts to increase the participation of underrepresented minority students in materials research such as reciprocal exchange of students and faculty members, development of new courses in the field of energy, creation of research opportunities for K-16 students/teachers, and keeping the public informed about the advances in materials research and technology.
	The disproportionate hardship imposed by the pandemic on underrepresented minority students, especially those from socioeconomically disadvantaged backgrounds, is well-established. This PREM Seed award, funded under the American Rescue Plan Act of 2021, will develop a pathway to recruit, train and retain students at a Historically Black University, the North Carolina Agricultural and Technical State University, in partnership with the Cornell University Materials Research Science and Engineering Center, to help create a world-class, next-generation workforce to tackle challenges related to the discovery, design, and development of materials for a variety of technological applications, but particularly relevant for clean and renewable energy research and related industries.

DIVISION OF COMPUTER AND NETWORK SYSTEMS
American Rescue Plan [$439,817](#)

Title	[CISE-MSI: DP: IIS:III: Deep Learning Based Automated Concept and Caption Generation of Medical Images Towards Developing an Effective Decision Support System (DSS)](#)
Institution	Morgan State University; Baltimore, MD

Research & Recovery

Led by Morgan State University, Maryland's largest HBCU, this project focuses on the intersection of biomedical informatics and imaging science, working to develop high quality datasets of human-annotated visual concepts in images that appear in public collections such as open access biomedical journals, then using those datasets to train novel vision, machine learning, and natural language processing algorithms. The end goal is the development of an AI-based prototype that helps physicians focus on interesting image regions, find relevant comparison images, and describe findings in correct and standard ways, all of which can reduce medical errors and benefit both medical departments and society by reducing the cost per exam. The work will support multi-institutional research and educational collaborations between three minority-serving institutions, providing advanced research and classroom training in AI, ML, and cloud computing to students from groups historically underrepresented in computing.

Minority-serving Institutions (MSI) were some of the hardest hit in the pandemic in terms of losing students, funds, and educational opportunities associated with them. This project will help these universities navigate that hit, both (a) by helping to retain strong faculty and (b) providing student educational opportunities, via the Pathway to Success program described that connects students with industry partners and postgraduate research opportunities.

OFFICE OF ADVANCED CYBERINFRASTRUCTURE
American Rescue Plan [$394,473](#)

Title	[CC* Compute: A campus-wide computing resource for research and teaching at the University of Washington Bothell](#)
Institution	University of Washington Bothell; Bothell, WA

Research & Recovery

Currently, the University of Washington Bothell does not have general access to research computing resources. This project will transform the capacity for computational science research and education on campus. The University of Washington maintains an integrated, scalable, super-computing infrastructure called Hyak to support research computing across all units and campuses. Academic and research units at the university purchase nodes on Hyak as an

alternative to deploying and operating their own high-performance systems. This award will allow the University of Washington Bothell campus to become a participant in the Hyak system, creating a dedicated research computing capacity for its faculty and students.

The team of researchers participating in this project form the core users of the new system and span a wide range of computational research fields including astrophysics, climate modeling, biochemistry, genomics, machine learning, operations research, and mathematics. The new capacity will allow the development of a larger cross-campus initiative for computational science education supporting our undergraduate teaching mission.

DIVISION OF ATMOSPHERIC AND GEOSPACE SCIENCES
American Rescue Plan $359,379

Title	HBCU-Excellence in Research: Estimate of Ground Nitrogen Dioxide (NO2) and Ozone Concentrations by Using Multiple Satellite Data and Machine Learning Techniques
Institution	Spelman College; Atlanta, GA
Research & Recovery	Spelman College is a historically Black women's liberal arts college. The goal of this HBCU-Excellence in Research is to improve estimates of ground nitrogen dioxide and ozone concentrations over the contiguous U.S. at high spatial and temporal resolution using machine learning techniques. This data will be useful in multiple fields, including public health, environmental health, air quality, agricultural research and environmental justice and inequality. The results of this project will be beneficial for air quality management and climate resilience planning.

This award supports an early career female scientist. Female scientists have been disproportionally affected by the pandemic due to challenges such as increased care-giving responsibilities. |

OFFICE OF POLAR PROGRAMS
American Rescue Plan $403,020

Title	DISES-RCN: Resilience in agricultural socio-environmental systems
Institution	University of Nebraska; Lincoln, NE
Research & Recovery	A Research Coordination Network, led by the University of Nebraska-Lincoln, will bring together four existing agriculture research networks to create a

'network of networks' to address large-scale, big-picture knowledge gaps in agricultural sciences. The network will build a robust transdisciplinary and collaborative community for long-term, multi-scale research on resilient agricultural systems. The project will enable data science advances and development of practical applications to aid vulnerable agricultural systems, useful to decision makers, researchers, farmers, and the public. These scientific advances will contribute directly to improving food and natural resource sustainability.

The project will directly impact researchers, students, scientists, technicians, farmers, stakeholders, and partners across the extensive and diverse membership of the networks. The Research Coordination Network will also mentor, train, and challenge students in diverse and innovative research, and connect them with scientists and communities across the network to promote professional and personal growth. Findings and results will be broadly disseminated through the four networks and beyond. This project will support a variety of researchers and students, many of whom are at vulnerable career stages and have experienced disproportionate negative impacts from the pandemic. The lead organization for this award is in an EPSCoR state.

DIVISION OF BEHAVIORAL AND COGNITIVE SCIENCES
American Rescue Plan $399,820

Title   Indigenous-Led Ecological Restoration

Institution   Boise State University; Boise, ID

Research &   With support from NSF's Build and Broaden program, the study investigates
Recovery   the complex relationship between biological conservation and Indigenous peoples that can lead to innovative conservation efforts that support Indigenous ecological and cultural goals. This research examines how Indigenous groups navigate institutional and environmental legacies to restore ecologically and culturally significant species. The study supports Indigenous-led ecological restoration by developing qualitative and geospatial data to inform management efforts that foster biodiversity protection and engagement with Tribal Nations.

The project advances STEM education by supporting students at a Tribal college, developing teaching modules on Indigenous-led ecological restoration, and producing web-based digital map products to communicate diverse ecological restoration practices.

DIVISION OF SOCIAL AND ECONOMIC SCIENCES
American Rescue Plan $215,740

Title   Build and Broaden: Growing Capacity in Research Examining Entrepreneurship

Institution   California State University San Marcos; San Marcos, CA

Research &   The goals of this project are to examine entrepreneurship among minority
Recovery   communities and identify how success varies for individuals who experience
discrimination. The proposed research utilizes interviews and focus groups to
better understand the factors that shape the success or failure of
entrepreneurial ventures among entrepreneurs of color and the ways in which
discrimination shapes the pursuit of independent business ventures. This study
also evaluates how individuals understand their entrepreneurship as part of
their larger social environment and as a strategy for change. Findings from this
project will be useful to policymakers as well as to organizations seeking to
support entrepreneurship within marginalized communities.

The pandemic has precipitated a decline in minority-owned businesses.
Understanding entrepreneurial resilience is an important concern for American
economic development and for scientific insight on entrepreneurship more
generally. This project creates opportunities for collaboration within minority-
serving institutions, provide opportunities for minority students and community
members to build research capacity through training and experience, and
promote examples of the resilience of minority entrepreneurs.

DIVISION OF RESEARCH ON LEARNING IN FORMAL AND INFORMAL SETTINGS
American Rescue Plan $163,357

Title   Collaborative Research: Rethinking Circle Time: Integrating Computational
Thinking into K-2 Literacy

Institution   Indiana University; Bloomington, IN

Research &   To prepare all students to participate in our increasingly digital society,
Recovery   computer science (CS) and computational thinking (CT) education opportunities
must engage all students in CS ideas and practices to help them understand
how computing influences the world. Led by Indiana University, the Rethinking
Circle Time project will examine the learning and instruction required for K-2
students to engage meaningfully with CT. With literacy being a strong focus at
the K-2 levels, this project will research the process of rethinking literacy "circle
time" - a reference to whole group literacy instruction. Rethinking Circle Time
will engage with K-2 students, in-service teachers, and pre-service teachers to
design, implement, and iterate different literacy activities that build students'

CT knowledge and interests to explore connections between literacy and CT to learn about how to help students, especially girls, gain key CT understandings.

The overarching research question being addressed in this project is: What are models for integrating computational thinking and literacy in K-2 classrooms that support key CT understandings and abilities for all students and guide high-leverage instructional practices for teachers? This question will be answered through design-based research using a multi-tiered design experiment that incorporates feedback loops for each tier based on findings focused on student learning; student interest and motivation with an emphasis on girls; and instructional innovations, practices, and experiences of both in-service and pre-service teachers. The project's partner schools serve a diverse range of learners, including students from underrepresented groups.

DIVISION OF ENGINEERING EDUCATION AND CENTERS
American Rescue Plan $369,821

Title	Research-Oriented Learning Experiences (ROLE) Program
Institution	New Mexico State University; Las Cruces, NM

Research & Recovery   The development of a Research-Oriented Learning Experiences (ROLE) program at New Mexico State University (NMSU) will provide Latino/a college students with the tools and knowledge required to succeed in Electrical and Computer Engineering (ECE) majors in particular, and in STEM-related degrees in general. ECE is a field of great relevance for our modern society where Latinos/as are commonly underrepresented. This project will encourage Latino/a undergraduates to participate in high-impact research-oriented educational activities, where they will conduct research in collaboration with Latino/a graduate students and ECE faculty, leading to pathways to graduate programs. This project will also train Latino/a graduate students to work with a selected group of undergraduates, further refining their leadership skills in a set of well-structured mentoring and research activities. By focusing on Latinos/as, a population relevant for the demographics of NMSU, this research project will produce outcomes aligned with the mission of the NSF's Broadening Participation in Engineering (BPE) program. These outcomes will be scalable, sustainable, and applicable to various contexts, settings, and demographics within Engineering and Sciences.

This award supports the research and education of Latino/a undergraduate and graduate students, who as a group have been disproportionately impacted by the pandemic and are under-represented in engineering and other STEM fields. The project is being performed at New Mexico State University, which is a Hispanic-Serving Institution in an EPSCoR jurisdiction.

NSF Research News

NSF News: [50 postdoctoral fellowships awarded to early-career scientists in the social, behavioral and economic sciences](#)
Science Matters: [Developing the 21st century data science workforce](#)
Research News: [Engineers examine the mechanical forces that influence cell development](#)
Scientist Selfie: [Carlos Peredo, NSF Postdoctoral Scholar & Paleobiologist](#)