



American Rescue Plan & COVID-19 Response Update

Updated September 8, 2021

FACTS

\$212,275,774

**ARP Research Recovery
Funds Mobilized**

730 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 disproportionately 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.
- Post-doctoral 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.

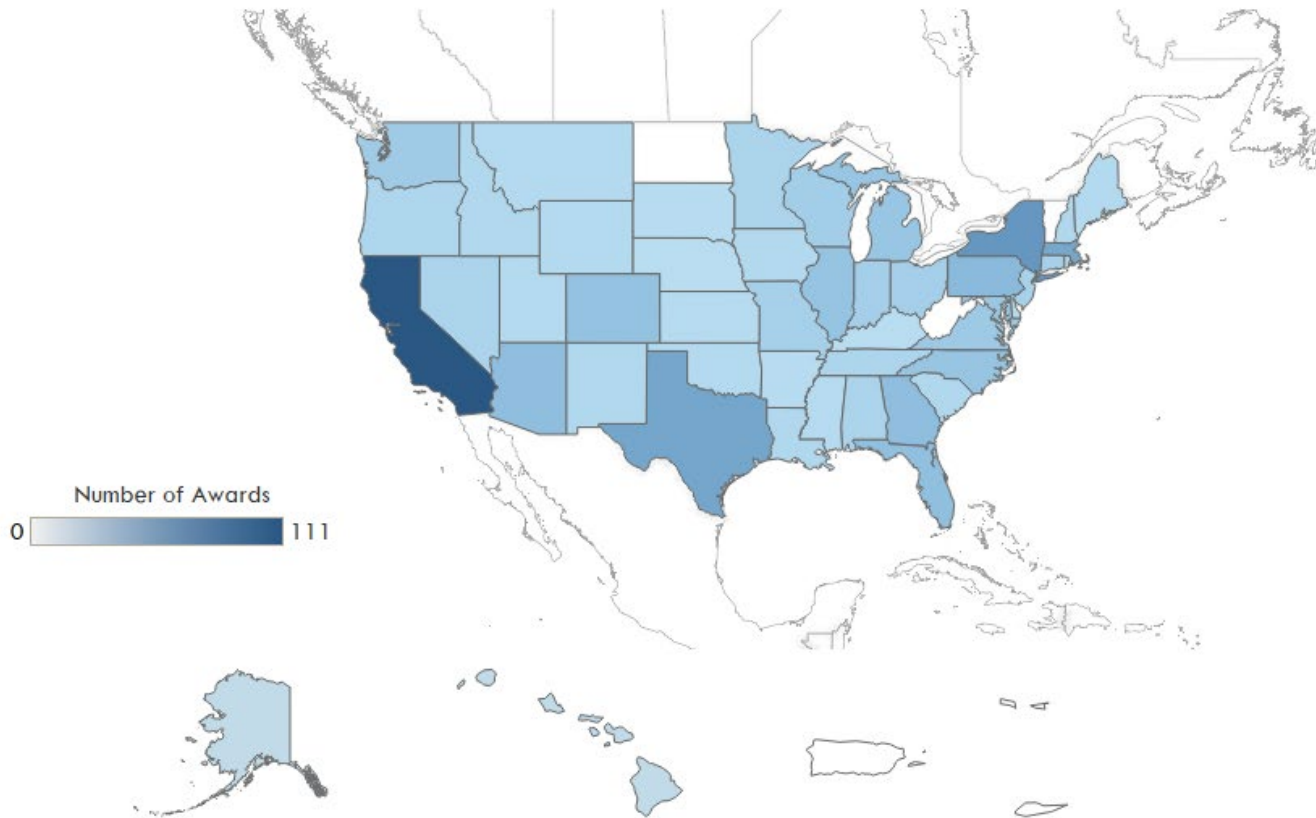


BROAD DISTRIBUTION. To ensure a broad distribution of funding and in further pursuit of the funds reaching those most impacted by the pandemic, NSF is using these funds towards an expansive research portfolio that prioritizes disproportionately affected persons at every institution as well as all persons 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 funds)	COVID-19 Research (CARES Act + FY20 + FY21)
Number of Awards	730	2,415	1,262
Funding Deployed	\$212,275,774	\$531,414,232	\$234,968,741



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

Supporting Postdoctoral Researchers

Postdoctoral researchers have been in an especially vulnerable position due to lost research time and an unstable job market throughout the COVID-19 pandemic. Postdoctoral researchers, or postdocs, are PhD-holding scientists in a research-intensive career stage between a doctoral degree and an independent research position, such as a tenure-track faculty. Although variable across the many research fields, the postdoctoral position is widely considered an important stage of career development. The upset in in-person research, travel, collaboration, and conference attendance jeopardizes future research careers and the overall future of the STEM workforce.

To ensure the future stability of the US's STEM workforce, NSF has worked diligently to support postdocs. Each of the seven science and engineering directorates at NSF has expanded or stood up a fellowship program specific to support postdocs. Each program is designed with a uniquely tailored approach best suited to the specific needs of early-stage investigators of that discipline. This support has taken the form of new fellowship programs, additional funding to existing programs to support more fellows, new supplement programs to extend fellowships for current fellows, and new supplements for PIs of existing awards to support a postdoc position.

Approximately 505 postdoctoral fellows are being supported through a combination of FY2021 appropriations and American Rescue Plan funds, and an estimated 176 existing postdoctoral fellows were able to extend their fellowship to finish research projects delayed by the pandemic. These are just a few of the direct ways that NSF is supporting the research community.

AWARD HIGHLIGHTS

DIVISION OF MATERIALS RESEARCH American Rescue Plan \$247,112



Title [LEAPS-MPS: Photodynamic Hybrid Polymer Network Sponges and their Structure-Property Relationships](#)

Institution Bowling Green State University; Bowling Green, OH

Research & Recovery The goal of this research is to develop a fundamental understanding of a series of selective, light activated smart material sponges useful for environmental remediation of omnipresent toxic pollutants such as perfluoroalkyl (PFAS) “forever chemicals.” This project will also meld together a diverse team of researchers to carry out this work and to influence, train, and mentor a broad representation of middle, high school and undergraduate students to recruit and train them for future success in the U.S. science workforce. The proposal was submitted in response to the LEAPS-MPS solicitation which is designed to support young scientists whose transition to faculty positions is severely impacted by the COVID-19 epidemic.

DIVISION OF OCEAN SCIENCES American Rescue Plan \$118,103



Title [EAGER: Collaborative Proposal: Probabilistic Scenarios for Megathrust Earthquakes and Tsunami Genesis](#)

Institution South Dakota School of Mines and Technology; Rapid City, SD

Research & Recovery Predicting tsunamis is a challenging problem because it frequently requires an understanding of geological details in inaccessible regions of the Earth’s crust. This research presents a new approach that brings the combined power of mathematics and statistics to bear on this problem. Mathematics describes the physical processes of earthquakes and tsunamis and the statistics account for what is known, or more importantly, what is unknown about the geological features where tsunamis are produced. The results of this research could provide the tools to evaluate risks for coastal locations that are prone to tsunamis. This project includes an educational component that will provide mathematical modelling training, and engage students from underrepresented groups in science, technology, engineering, and mathematics.



DIVISION OF OCEAN SCIENCES
American Rescue Plan \$\$310,285

Title [OCE-PRF: Determining the depth of fluid infiltration in slow and ultra-slow spread oceanic crust](#)

Institution University of Wyoming; Laramie, WY

Research & Recovery The goal of this project is to evaluate the depth to which seawater penetrates the ocean crust, and whether seawater penetration depth varies with tectonic processes across different ocean basins. The results will provide a deeper understanding of earth system processes and interactions between the oceans and the Earth's crust. Science outreach and education will be a central tenet of the project and involve: (1) outreach with University of Wyoming Office of Diversity, Equity and Inclusion to promote STEM and geoscience for underrepresented groups (2) community lectures, both online and in person, including at the Wind River Indian Reservation, and (3) creation of a University of Wyoming Geological Museum exhibit on the generation of ocean crust, hydrothermal vents and the biological diversity of the seafloor. Science outreach and education to under-represented groups will be part of this project including with Native American communities near the University of Wyoming (in particular, the Wind River Indian Reservation), communities that were disproportionately impacted by the pandemic.



DIVISION OF EARTH SCIENCES
American Rescue Plan \$326,121

Title [Single-grain, multi-parameter characterization of detrital zircon grains to test for the influence of sample processing and sedimentologic processes](#)

Institution University of Iowa; Iowa City, IA

Research & Recovery A cornerstone of modern studies of sedimentary rocks is the chemical dating of zircon, a common mineral grain in sandstone. This project will investigate certain factors that might make dating inaccurate, improving this method of research. This project will provide a geological field experience around the Black Hills area in South Dakota for students and in-service teachers. This project provides career development opportunities to female scientists by enhancing non-academic partnerships. It also includes extensive capacity building in STEM, by offering immersive experiences for students, in-service and pre-service teachers.

DIVISION OF INTEGRATIVE AND COLLABORATIVE EDUCATION AND RESEARCH

American Rescue Plan \$284,964



Title [GP-IN: Pathways to tribal geosciences careers through cultural connections to iconic landscapes](#)

Institution Idaho State University; Pocatello, ID

Research & Recovery This program will focus on recruiting Native Americans into the geosciences at Idaho State University (ISU) in collaboration with six educational and non-profit partners. The overarching goal is to increase the number and diversity of geoscientists attaining undergraduate degrees in eastern Idaho. To achieve this, the project offers a three-pronged effort that will blend informal and formal geoscience learning across multiple education levels. The three levels of engagement for the participants include: 1) building a sense of identity and professional skills through a youth employment program and related activities; 2) accessing trained geoscience mentors who will participate in the program and 3) developing a “bridge” program to help students prepare for, and transition to, undergraduate programs. Native American communities were disproportionately impacted by the pandemic. This program helps Native Americans gain geoscience skills and access higher education programs improving career prospects and opportunities, thereby helping Native American communities to recover economically.

DIVISION OF MATERIALS RESEARCH

American Rescue Plan \$800,000



Title [PREM Center for Ultrafast Dynamics and Catalysis in Emerging Materials \(C-UDCEM\)](#)

Institution The University of Central Florida; Orlando, FL

Research & Recovery The proposed PREM (Partnerships for Research and Education in Materials) partnership between the University of Central Florida (UCF) and the Materials Research Science and Engineering Center (MRSEC) at the University of Washington (UW) will develop a vibrant collaborative research and innovative education training program in materials, providing research and education opportunities to 15-20 underrepresented minority graduate and undergraduate students. An interdisciplinary team of researchers from UCF and UW will deploy integrated theoretical and experimental approaches for the rapid discovery of advanced materials for quantum computing, low power electronics and new catalyst reactions in line with the vision set forth in the Materials Genome Initiative (MGI). Students will be co-mentored and will carry out research at both academic institutions. The disproportionate hardship

levied by the pandemic on underrepresented minority students, especially those from socioeconomically disadvantaged background, is now well known. This PREM seed award, funded under the American Rescue Plan Act of 2021, will help with recruitment and retention of these students in cutting-edge STEM research at UCF, a Hispanic Serving Institution, by providing much needed financial support to alleviate the hardship.



DIVISION OF EARTH SCIENCES
American Rescue Plan \$38,568

Title [Collaborative Research: Evaluating Snowlines Across the Tropics - The geomorphic imprint of tropospheric cooling and drying during the Last Glacial Maximum](#)

Institution University of Maine; Orono, ME
Dartmouth College; Hanover, NH

Research & Recovery One of the great unsolved mysteries of Earth science is why the global climate see-saws between ice ages (glacial periods), when multi-kilometer thick ice sheets spread across North America and northern Europe, and interglacial periods, when the Earth is much warmer and continental ice sheets are restricted to very high latitudes. Understanding how we transition from ice ages to warmer periods and back, requires understanding the time sequence of changes to various parts of the climate system. However, the global climate system is a vast, complicated, interconnected system. For example, climate changes in the tropics can influence the higher latitudes. To investigate these complexities, this project will use high-resolution satellite imagery and other remote image datasets to study the magnitude of climate changes in the tropics. The project team will seek to recruit students from underrepresented groups to participate in the research and will create Virtual Field Labs that will be widely distributed for use in high school and college settings.

DIVISION OF CIVIL, MECHANICAL AND MANUFACTURING INNOVATION
American Rescue Plan \$559,949



Title [BRITE Relaunch: Examining the Role of Mechanotransduction in Smooth Muscle Cell Phenotype Modulation](#)

Institution Mississippi State University

Research & Recovery The vascular smooth muscle cells (VSMCs) that make up one of the layers of arteries can be divided into two distinct types: contractile and synthetic. Contractile VSMCs regulate blood pressure in the artery by contracting or relaxing. However, they can revert into the synthetic type in response to an

injury to the blood vessel. Synthetic VSMCs are responsible for synthesis of replacement cells and secretion of substances that are needed for vessel healing. This Boosting Research Ideas for Transformative and Equitable Advances in Engineering (BRITE) Relaunch project hypothesizes that a third type of VSMCs exists, and the change in the cells to this third type is caused by stretch within the vascular tissue. This work could drive future research that will reduce the severity of heart disease complications experienced by patients and reduce the costs of treating high-risk patients. This project will also increase the participation of students from underrepresented groups in research -- in particular, first-generation, low-income students.

DIVISION OF INTEGRATIVE AND COLLABORATIVE EDUCATION AND RESEARCH

American Rescue Plan \$478,980



Title	<u>NNA Research: Collaborative Research: Socio-ecological considerations for sustainAble Fuel treatments to Reduce wildfire Risk (SAFRR)</u>
Institutions	University of Colorado at Boulder; Boulder, CO University of Alaska Anchorage; Anchorage, AK Northern Arizona University; Flagstaff, AZ
Research & Recovery	The boreal forest, a belt surrounding the Arctic south of the tundra, represents about 30% of the global forest area and provides critical food, shelter, and other needs to local and Indigenous peoples and wildlife, as well as key economic opportunities at the local, regional, and global scale. Wildfires occur naturally in boreal forests, but they have become increasingly dangerous as the climate warms. In this project, researchers are working with agency personnel managing forest lands and wildfire to create an integrated framework to evaluate fuel treatments; assess their short-term and long-term ecological effects and influence on wildfire behavior; examine how likely they are to be acceptable to residents; and evaluate the ability of alternative fuel treatment designs to achieve social, ecological, and public safety goals. The project is providing insights into how vegetation responds to different treatments, installation and maintenance costs, and acceptability to residents of different types of treatments in boreal forests, and is improving how land managers, landowners, and communities can use fuel treatments to reduce wildfire risk. Indigenous communities were particularly heavily impacted by the pandemic. This project will help Arctic indigenous communities living near boreal forests by reducing the risks of wildfires and improving public safety while maintaining important fuel resources.

Related NSF Research News

Science Matters blog: [Once Considered Too High-Risk, Supercomputer Simulations of 'Wiggling and Jiggling' Atoms Could Help Stop Coronavirus](#)

Research News: [Researchers discover hidden SARS-CoV-2 'gate' that opens to allow COVID-19 infection](#)