



American Rescue Plan & COVID-19 Response Update

Updated January 28, 2022

FACTS

\$375,565,594

**ARP Research Recovery
Funds Mobilized**

1,150 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.
- 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.

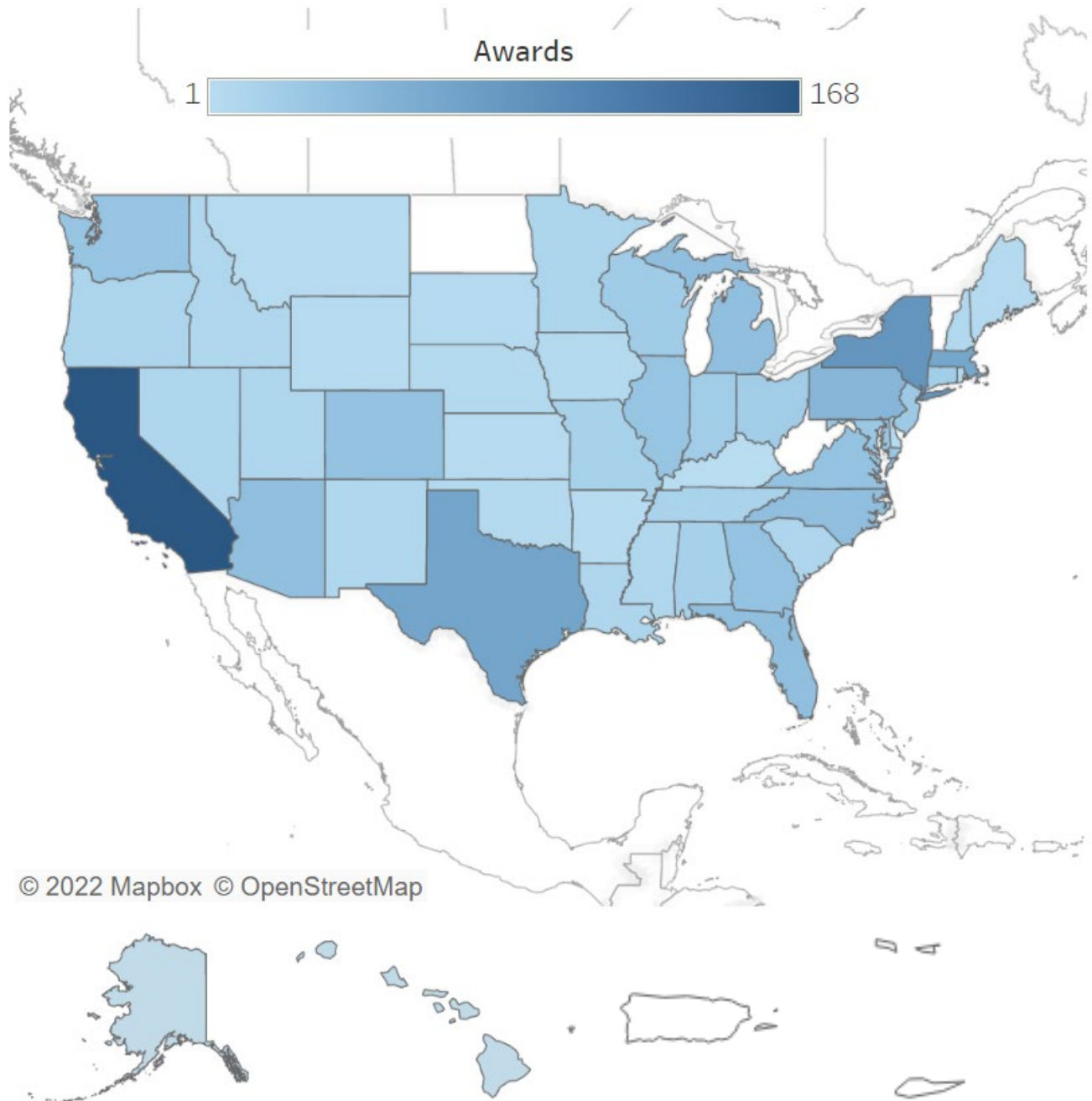


BROAD DISTRIBUTION. To ensure a broad distribution of funding and in further pursuit of the funds reaching those most impacted by the pandemic, NSF is using these funds towards an expansive research portfolio that prioritizes disproportionately affected persons at every institution as well as all persons 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	1,150	2,646	1,284
Funding Deployed	\$375,565,594	\$604,661,739	\$240,421,215



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 FUNDING HIGHLIGHT

Directorate for Biological Sciences

Research and Mentoring for Postbaccalaureates in Biological Sciences (RaMP) program

The COVID-19 pandemic disrupted many college students' plans to participate in experiences as undergraduates. Recognizing a need among students whose research experiences were cut short or unable to start during the pandemic, NSF's Directorate for Biological Sciences invested nearly \$12 million in 259 supplements to current research awards as a part of its [Research Experience for Post-Baccalaureate Students \(REPS\) in the Biological Sciences Supplemental Funding Opportunity](#).

Spurred by the positive community response to REPS and a desire to sustain investment in postbaccalaureate training with the goal of broadening participation in STEM, NSF has created the [Research and Mentoring for Postbaccalaureates in Biological Sciences \(RaMP\) program](#). RaMP will establish networks of innovative mentoring and training programs to support full-time paid research opportunities for recent college graduates who have had few or no research opportunities in the biological sciences during college.

Research experiences, including laboratory-, field-, and computation-focused opportunities, provide students with critically important exposure to STEM fields, often encouraging them to pursue STEM careers. Whereas many students acquire such experience as undergraduates, others – such as those who are members of groups underrepresented in STEM, first-generation college students, or those attending under-resourced institutions – often have limited opportunities to participate. The RaMP program will support these types of research experiences for postbaccalaureate students, thus providing an important bridge and a competitive edge for entry to future careers in STEM, including pathways into research-focused M.S. or Ph.D. programs, industry, federal or state agencies, education and research centers, and other STEM positions.

AWARD HIGHLIGHTS

DIVISION OF COMPUTER AND NETWORK SYSTEMS American Rescue Plan \$152,350



Title	<u>Collaborative Research: CISE-MSI: RPEP: SaTC: HBCU Artificial Intelligence and Cybersecurity (AI-CyS) Research Partnership</u>
Institution	University of the District of Columbia; Washington, DC
Research & Recovery	<p>Cybersecurity vulnerabilities are growing at a scale and speed that strains human capacity to proactively address threats. Developing artificial intelligence (AI) and machine learning techniques to support prediction and detection capabilities is thus an important area of research. This project brings together researchers from seven historically Black colleges and universities (HBCUs) and three National Research Laboratories to develop the AI-CyS research partnership at the intersection of AI and cybersecurity. Efforts will include developing mechanisms to expand current collaborations and foster new ones, sharing expertise between HBCU members, and hosting an annual research conference that allows faculty and students from both current and potential partner HBCUs to showcase their cybersecurity research and create connections to other researchers and resources. These efforts will advance research in cybersecurity in five open problems that stand to benefit from the application of AI techniques, research capacity at the partner institutions, and research and educational opportunities for students at HBCUs, who are often members of underrepresented groups in computing.</p>

This award supports several HBCUs, which were impacted by the pandemic with a decline in student enrollment, and by the need to adjust education during a pandemic. Supporting multi-institutional remote collaboration that includes national labs provides valuable resources that help make up for the pandemic's impacts on education and faculty career development.

DIVISION OF RESEARCH ON LEARNING

American Rescue Plan \$299,652



Title	<u>A Multi-District Collaboration to Develop Justice-Focused Computational Thinking Pathways for Middle School English Language Arts</u>
Institution	University of Pittsburgh; Pittsburgh, PA
Research & Recovery	<p>This Research to Practice Partnership project establishes a network that includes four school districts in Pennsylvania, middle school educators, University of Pittsburgh faculty, and a regional educational support center (Allegheny Intermediate Unit) collaborating to develop a justice-focused computational thinking (CT)/ computer science (CS) curriculum for middle school</p>

English language arts. The project will explore the effect of this instruction on historically underrepresented groups in CS (specifically, female and Black students) and advances knowledge on transforming CS education and practices in building diverse partnerships. The project instructional materials will be developed to build on and value students' diverse literacies, cultural resources, interests, and identities. The project's long-term goal includes creating innovative justice-focused curricula and related teacher professional development materials for integrating CT/CS into middle school literacy instruction. The outcomes from this grant will support STEM and literacy educators and curriculum developers to rethink methods of integrating CT/CS across disciplines. Additionally, the project will develop strategies to help build CS identities among those who feel least connected to it, such as girls and students of color.

This project will allow researchers to examine social justice challenges within the context of computer science delivered in English language arts middle school classrooms. Project funding through ARP will broaden computing among traditionally underrepresented groups and spotlight social justice challenges in society recently highlighted by the pandemic.

DIVISION OF ENGINEERING EDUCATION AND CENTERS
American Rescue Plan \$186,861



Title [ERI: Towards Data-Capable Engineers with a Variability-Capable Mindset](#)

Institution Franklin W. Olin College of Engineering; Needham, MA

Research & Recovery Variability is a key challenge in data analysis. Current engineering education produces professionals who struggle to recognize and manage variability in engineering applications. This lack of engineering workforce capability leads to inefficient designs, and in some cases, dangerously unreliable systems. In order to realize NSF's Big Idea of Harnessing the Data Revolution, engineers will need a variability-capable mindset. This project will be a mixed-methods study of practicing engineers to investigate their ability to identify and treat different sources of variability, to develop a quantitative instrument to characterize current engineering workforce capabilities, and to design and deploy teaching interventions to improve engineers' variability-capability. Funded by NSF's Research in the Formation of Engineers initiative, this project will study how working engineers react to variability and will train them to handle it more efficiently.

Awards from the NSF Engineering Research Initiation program build engineering research capacity across the nation by investing in new academic

investigators who have yet to receive research funding from federal agencies. The program aims to support new investigators as they initiate their research programs and advance in their careers as researchers, educators, and innovators. This support also aims to broaden the base of investigators involved in engineering research and therefore is limited to investigators not affiliated with “very high research activity” R1 institutions.

**DIVISION OF CIVIL, MECHANICAL AND
MANUFACTURING ENGINEERING**
American Rescue Plan \$200,000



Title [ERI: High-performance Human-robot Collaborative Manufacturing Enabled by Integrated Multimodal Teaching, Learning, Prediction and Interaction](#)

Institution Montclair State University; Montclair, NJ

Research & Recovery To advance human-robot collaborative manufacturing, this Engineering Research Initiation award will develop a competitive solution to train robots to be effectively programmed by learning from human demonstrations and to actively assist human partners in manufacturing tasks. The project will develop computational models that leverage the learned strategies to predict human intentions and enhance human-robot collaboration. Moreover, user studies will be conducted to evaluate the effectiveness of the approaches in collaboration quality improvement by applying findings to real-world human-robot collaborative tasks in advanced manufacturing contexts. This project will offer students from underrepresented groups the latest robotics training and research and launch hands-on robotics workshops for local K-12 schools, especially those in underserved districts.

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OFFICE OF POLAR PROGRAMS
American Rescue Plan \$315,000



Title [GP-UP: RUI: Enhancing Underrepresented Minority Participation in STEM and the Applied Geosciences Through Integrated Experiential Activities](#)

Institution University of Wisconsin, Eau Claire; Eau Claire, WI

Research & Recovery Addressing grand challenges such as climate change and natural resource depletion requires a diverse scientific workforce with a strong background in applied geosciences. Expanding and broadening the future geosciences workforce must include focused efforts to recruit and support individuals from historically excluded groups. This project is designed to recruit, train and foster career success among individuals from underrepresented groups in western Wisconsin and in Minnesota. The program will use hands-on learning, dedicated mentorship, peer support, and high-impact experiences designed to maximize student engagement and retention in the geosciences. Students will be integrated into an intentional Geoscience Learning Ecosystem that will promote work-based learning experiences through a network of academic, industry (e.g., mining, hydrogeology, environmental firms), governmental (e.g., Eau Claire Health Department., Chippewa County Forests and Parks Department) and non-profit entities. This award provides long-term and meaningful support to underrepresented high school and college students who have been disproportionately impacted by the pandemic.

DIVISION OF COLLABORATIVE EDUCATION AND RESEARCH
American Rescue Plan \$169,231



Title [Collaborative Research: GP-IN: Connected to Earth: Cross-Cultural Knowledge Exchange for Advancing Earth Science Learning](#)

Institution University of Hawaii; Honolulu, HI

Research & Recovery This project will bring together a community of K-12 teachers, educators, geoscientists, undergraduate students from underrepresented backgrounds, and cultural knowledge keepers and resource managers from Hawaii and Bad River and Red Cliff tribal communities in Wisconsin. The project team will work with Tribal elders and knowledge keepers to provide professional development for K-12 educators that is tied to places with scientific and cultural significance and relevant to learners' interests, cultural backgrounds, lived experiences and community needs. The goal is to support educators in developing STEM curriculums built upon local knowledge and aligned with Next Generation Science Standards (NGSS) Earth Sciences and Science and Engineering Practices. Students participating in this project will acquire

knowledge and skills necessary to address societal issues and to build careers in fields such as resource management and conservation, sustainability, environmental consulting, science communication, and science education. Science education, outreach, and workforce development to underrepresented groups will be central to this project, including Native American communities in Wisconsin that were disproportionately impacted by the pandemic. This project includes extensive capacity-building in STEM by offering professional development experiences for students and for in-service and pre-service teachers.

DIVISION OF BEHAVIORAL AND COGNITIVE SCIENCES
American Rescue Plan \$258,811



Title [MRI: Acquisition of Electroencephalography Equipment for the Study of the Neuroplasticity of Language and Cognitive Processes in Bilingualism and Multilingualism](#)

Institution California State University, East Bay; Hayward, CA

Research & Recovery Interdisciplinary scientific research is critical to the advancement of our understanding of the complex mechanisms in the brain that support thought and language. Those processes require perspectives from developmental science, cognitive science, language science, cognitive aging, neurolinguistics, and other fields. The grant supports the acquisition of a state-of-the-art electroencephalography (EEG) system that will be used to non-invasively and precisely measure electrical activity generated by neurons. The EEG equipment will permit cross-disciplinary collaborations among faculty at several institutions to study the neural processes that support language and cognitive processes in bilingual and multilingual adults and how these processes change in response to new experiences or injury.

NSF's Build and Broaden Program supports research, training opportunities and research infrastructure at minority-serving institutions, many of which were impacted particularly hard by the COVID-19 pandemic. The new equipment will be used to train a diverse student population in cognitive neuroscience research methods, thereby promoting access to STEM careers. California State University East Bay is a Hispanic-serving and Asian American and Pacific Islander-serving Institution, drawing first-generation and minority students from the diverse Bay Area community who are historically underrepresented in many fields.

DIVISION OF SOCIAL AND ECONOMIC SCIENCES

American Rescue Plan \$632,515



Title [Collaborative Research: The Effects of Information, Mentoring and Time on Economic Faculty at MSIs](#)

Institution Spelman College; Atlanta, GA

Research & Recovery Faculty at Minority-serving Institutions (MSIs) make considerable contributions to educating and training STEM leaders. Yet, the National Science Foundation has received comparatively few proposals from MSI faculty over time. This project will implement an intervention that will support MSI faculty in two ways. First, MSI faculty will be granted time to write and submit proposals to NSF. Second, faculty will be mentored through the proposal preparation process. The project will evaluate the intervention by using an experimental design, collecting data from MSI faculty, and analyzing those data using quantitative and qualitative methods.

The intervention is expected to increase NSF proposal submissions by MSI faculty, improve proposal preparation skills, and contribute to greater inclusion of MSI faculty in STEM. Findings will be disseminated at academic conferences, meetings with federal agencies such as NSF, and through a final report to the National Bureau of Economic Research.

DIVISION OF MATERIALS RESEARCH

American Rescue Plan \$800,000



Title [Xavier-UChicago Partnership for Research and Education in Materials for Energy Storage and Sensing](#)

Institution Xavier University of New Orleans; New Orleans, LA

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. This specific award targets the development of infrastructure (facilities and human resources) at Xavier University of Louisiana, a primarily undergraduate and historically Black university. Xavier has a rich history of graduating Black American students who pursue careers in postgraduate education in health care and research-based

careers in STEM fields. Leveraging this strong reputation for STEM education, this PREM Seed award supports a partnership between the University of Chicago Materials Research Science and Engineering Center (MRSEC) and Xavier, which seeks to increase diversity in materials science and engineering through targeted interventions that focus on engaging underrepresented minority students in research early in their undergraduate education. This partnership also endeavors to increase undergraduate student involvement in energy-storage-related research in materials science and engineering through strategic collaborations with University of Chicago MRSEC faculty. Furthermore, through this Xavier-UChicago PREM Seed award, Xavier will build a strategic partnership with the UChicago MRSEC that is committed to strengthening STEM diversity, equity and inclusivity by enhancing efforts in student recruitment and retention.

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, Xavier University of Louisiana, a primarily undergraduate institution, in partnership with the University of Chicago 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 industries in energy storage.

DIVISION OF MATERIALS RESEARCH

American Rescue Plan \$799,058



Title	<u>Partnership for Research and Education in Soft Matter Research & Technology and Quantum Confinement Materials Design (SMaRT QD)</u>
Institution	Delaware State University; Dover, DE
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. This specific award targets the development of infrastructure (facilities and human resources) at two historically Black universities – Delaware State University and Claflin

University – to solve grand challenges in the areas of soft matter and quantum confined materials. The approach will use data-driven techniques centered on the principles of the Materials Genome Initiative to accelerate the discovery, design and development of these materials, which have potential applications in a range of technologies, including pollutant detection, drug delivery systems, and optoelectronic and biophotonic devices. The effort will catalyze a diverse and talented scientific community with expertise in polymers, physics, inorganic chemistry, and computational-based techniques, and it will build a strategic partnership with the Materials Research Science and Engineering Center (MRSEC) at the University of Delaware and a network of partners committed to strengthening STEM diversity, equity, and inclusivity.

The disproportionate hardship levied by the pandemic on underrepresented minority students, especially those from socioeconomically disadvantaged backgrounds, is well known. This PREM Seed award, funded under the American Rescue Plan Act of 2021, will develop a pathway to recruit, train, and retain students at two historically Black universities – Delaware State University and Claflin University in partnership with the University of Delaware MRSEC – 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.

Related NSF Research News

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Research News: ['Zapping' untreated water gets rid of more waterborne viruses](#)