



NSF
NATIONAL SCIENCE FOUNDATION

EHR
DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES

HRD
DIVISION OF HUMAN RESOURCE DEVELOPMENT

HRD PROGRAMS



ADVANCE
Organizational Change for Gender Equity
in STEM Academic Professions



AGEP
Alliances for Graduate Education and
the Professoriate




ECR
EHR Core Research

ISSUE 4

APRIL
2021



CREST
Centers of Research Excellence in Science
and Technology




HBCU-UP
Historically Black Colleges and
Universities-Undergraduate Program



HSI
Improving Undergraduate STEM
Education: Hispanic-Serving Institutions



LSAMP
Louis Stokes Alliances for Minority
Participation



NSF INCLUDES
Inclusion across the Nation of Communities of
Learners of Underrepresented Discoverers in
Engineering and Science



PAEMST
Presidential Awards for Excellence in
Mathematics and Science Teaching



PAESMEM
Presidential Awards for Excellence in Science,
Mathematics, and Engineering Mentoring



TCUP
Tribal Colleges and Universities Program

Letter from the Leadership

APRIL 2021



Dr. Jermelina Tupas

Dear Friends of NSF:

The National Science Foundation (NSF) has for decades sponsored science, technology, engineering, and mathematics (STEM) education programs that feature elements of the integration of research and education. The Foundation's characterization in this regard is clear-cut: For every research discovery there is created an associated educational asset.

How to utilize that asset could nowhere be more evident than in NSF's Centers of Research Excellence in Science and Technology (CREST) program. Beginning in 1987, the CREST provenance in leveraging the educational assets created through research and discovery is one of the longest-running at NSF. CREST projects must ensure that research is fully integrated with education so that today's revolutionary work will also contribute to the training of tomorrow's top scientists and engineers.

CREST projects are awarded to institutions with at least a 50% enrollment from students of groups underrepresented in STEM fields. The projects at these minority-serving institutions (MSI) are extraordinary examples of where discovery is the fuel for advancing knowledge, workforce development, and STEM leadership.

CREST projects offer an opportunity to engage student and faculty populations from underrepresented groups in numbers that can have significant impacts for the nation, consistent with the NSF goal to broaden participation. These projects align with the NSF mission to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

We are pleased to dedicate this monthly issue of our digital newsletter to the remarkable work of CREST project directors and their collaborators in building and enhancing the research capacity of minority-serving institutions, the training of postdoctoral fellows, and the advancement of the nation's STEM workforce and leadership.

Sincerely yours,

Jermelina Tupas

Dr. Jermelina Tupas

Deputy Director
NSF Division of Human Resource Development



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Centers of Research Excellence in Science and Technology

MEDIA

In 2002, a six-year, multi-million dollar CREST award to North Carolina Agricultural and Technical State University (NC A&T State) provided support for the university's Center for Advanced Materials and Smart Structures.

This award set the stage for the university to subsequently compete, and receive, a multi-million dollar NSF award for an Engineering Research Center. With this major support from two NSF programs, the NC A&T State team launched a revolution in the development of metallic bio-materials that are used in surgical procedures. Take a look at what the future holds for all of us at [smart implants](#).



Dr. Jagannathan Sankar, Distinguished Professor of Mechanical Engineering and Principal Investigator at the NSF Engineering Research Center, North Carolina A&T State University



North Carolina A&T State University medical team utilizing advanced smart implants

“The CREST program promotes training of postdoctoral fellows in science and engineering and, importantly, fosters collaboration among CREST Centers.”

Concrete, metals, wood, and plastics are composite materials that are everywhere visible in our daily lives.

Southern University and A&M College (SU), and Louisiana State University (LSU), collaborate in a CREST Center project that involves promoting advancements in multifunctional “smart composites” and related technology development, nanocomposites, novel microstructure design, and multiscale porous polymer composites. At the 2021 Virtual CREST/HBCU-RISE project directors’ conference, researchers from SU and LSU describe the remarkable advancements in our understanding of these [smart materials](#).

INTERESTING FACTS



To meet the challenge of creating an inclusive workforce that is representative of the nation’s diversity, the CREST program is partnering with the CREST community to support postdoctoral research fellows at CREST Centers.

The CREST program promotes training of postdoctoral fellows in science and engineering and, importantly, fosters collaboration among CREST Centers. While meeting its goal of building the research capacity of MSIs, CREST’s project activities advance the nation’s STEM workforce and leadership.

CREST instituted funding specifically for Historically Black Colleges and Universities (HBCUs) through support for an HBCU Research Infrastructure for Science and Engineering (HBCU-RISE) program activity. The collaboration between CREST and HBCUs is one of the strongest in the CREST portfolio.

CITIZEN SCIENCE MONTH

In just a couple of years, [Global Citizen Science Month \(April\)](#) has grown from a single day of events to a coordinated effort supported by SciStarter, the National Library of Medicine, Arizona State University, the Citizen Science Association, Science Friday, National Geographic and many other collaborators from around the world. Global Citizen Science Month in April encompasses online events and opportunities to contribute to projects from home. It is time to prepare. Learn more about this in the [Citizen Science Month Welcome Letter](#).

ACCOMPLISHMENTS

As of January 2020, the CREST program currently supports 34 active awards for CREST Centers around the nation, with four of these awards in the Commonwealth of Puerto Rico.

This number of CREST Centers represents only those still receiving NSF funding given that many more Centers have completed the NSF funding cycle and are still performing related research.

The January 2020 actively funded CREST Centers cover a wide range of disciplinary topics from materials science and nanotechnology to environmental science and ecosystem research, and computer privacy and security. CREST Centers feature extensive partnerships across the U.S. mainland and in Puerto Rico.



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STORIES OF IMPACT

Jackson State University (JSU) is designated as a “high research activity” institution by the Carnegie Foundation. The university is home to the [CREST Interdisciplinary Center for NanoToxicity](#). We take a moment to introduce you to Dr. Jerzy Leszczynski, a JSU *President’s Distinguished Fellow*. His contributions as the Director of the CREST Center are impressive; please take a moment to read about his remarkable career at JSU in an editorial featured in the [Journal of Food and Drug Analysis](#).

STORIES OF IMPACT

The University of Texas, Rio Grande Valley (UT RGV), is home to the CREST-supported [Center for Gravitational Wave Astronomy](#). Scientists at the center were part of the international team of scientists who contributed to both the initial, and now the second, detection of gravitational waves. This UT RGV CREST Center has the largest group of gravitational-wave researchers in Texas and is one of the largest from the United States involved in global [LIGO Scientific Collaboration](#).

The CREST-supported Center for Cellular and Biomolecular Machines at the University of California, Merced takes an interdisciplinary approach to studying biological and bio-inspired machines. The Center performs research on biomolecular and cellular assemblies, and produces various machines that can be either biological, or involved in diagnosis and therapeutic applications. A key feature of the Center is the graduate training program that will cover the interdisciplinary fields of biology and physics. Training is also available to high school teachers and undergraduates. Read more about this important work at [UC Merced Center](#).

The southwest United States is keenly aware of water as a precious resource. The CREST-supported Center for Water and the Environment at the University of New Mexico will research environmental water problems and technological solutions with a focus on the issues of drought. In addition to research, the Center will also develop a mobile trailer with demonstrations and activities about water designed for K-12 audiences. The Center has an additional focus on recruitment, retention and graduation of underrepresented students in STEM, which is integrated into the activities of the center through recruitment at local minority-serving colleges and community colleges. Please take a moment to enjoy a video about the University's [Center for Water and the Environment](#).

The City College of New York's (CCNY) Center for Interface Design and Engineered Assembly of Low Dimensional Systems (IDEALS) was established in 2016 with a \$5 million grant from the CREST program. It was designed to address the national need for accelerating the pace of discovery and deployment of advanced material systems as recommended in the Federal Government's Materials Genome Initiative. Partners with the IDEALS Center include Lehman College of the City University of New York (CUNY), the CUNY Advanced Science Research Center, the University of Puerto Rico at Mayaguez, and Virginia Polytechnic Institute and State University. The Center employs experimental, analytical and numerical modeling tools to design and discover complex novel materials with new and enhanced functionalities, and integrates education and research to enhance these enterprises. Read more about this unique multi-disciplinary CREST Center at [IDEALS](#).



HRD

NEWSLETTER

INFORMATION

The current CREST solicitation provides the following funding tracks:

- CREST Centers
- CREST Partnership Supplements
- CRST Postdoctoral Research Fellowship (PRF)
- HBCU Research Infrastructure for Science and Engineering (RISE)
- SBIR/STTR Phase IIa Diversity Collaboration Supplements
- CREST Solicitation (18-509) at [The CREST Solicitation](#)

LOOKING FORWARD

The May 2021 newsletter will feature the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). This presidential award was authorized by Congress in 1983, and is administered by NSF on behalf of the White House.

National Science Foundation

Directorate for Education
and Human Resources

Programs of the
Division of Human
Resource Development

2415 Eisenhower Avenue
Alexandria, Virginia 22314

NSF 21-067



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WHERE DISCOVERIES BEGIN