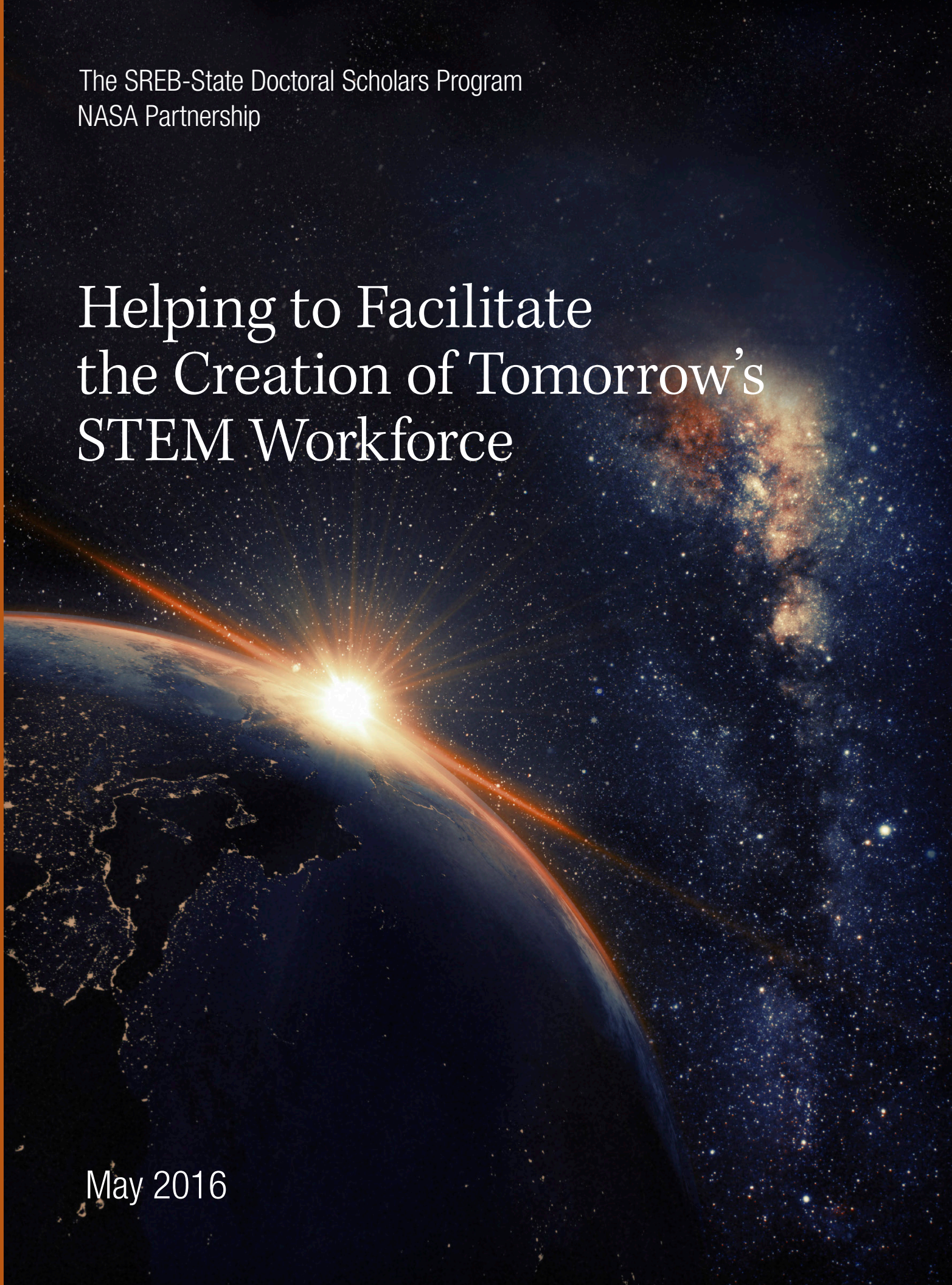
The SREB-State Doctoral Scholars Program
NASA Partnership

Helping to Facilitate the Creation of Tomorrow's STEM Workforce



May 2016

Toward a more inclusive STEM Workforce

Minority students have historically entered graduate programs at colleges and universities in the United States at lower rates than their majority peers — and they have earned graduate degrees at far lower rates. Far too few of them majored in science, technology, engineering or math (STEM) fields. The progress made has been mixed. The disparities in participation in graduate education, degree attainment, and major selection in recent years has an impact on the diversity of classrooms and laboratories — affecting students' overall richness of perspective and breadth of experience.

The SREB-State Doctoral Scholars Program NASA Partnership

The SREB-State Doctoral Scholars Program (DSP) partnered with NASA to foster diversity in STEM fields. SREB has long partnered with states, institutions, governmental entities and private foundations to diversify the nation's college and university faculties and increase STEM diversity. In 2013, DSP began working with NASA. The joint effort provides financial support for NASA fellows to attend DSP's annual Institute on Teaching and Mentoring. The scholars included two groups: the NASA Harriett G. Jenkins Pre-Doctoral Fellowship Project (JPFP) and Minority University Research Education Project (MUREP).

NASA Administrator, Charles Bolden and SREB-State Doctoral Scholars Director, Dr. Ansley Abraham at the 2015 Institute on Teaching and Mentoring

JPFP and MUREP both hope to create a more diverse and accomplished STEM workforce by increasing the number of graduate degrees awarded to underrepresented students — women, minorities and people with disabilities. The fellowships provide for professional development, mentorship and financial awards so students can focus on their research studies and goals.

Helping to Facilitate the Creation of Tomorrow's STEM Workforce

The Institute on Teaching and Mentoring

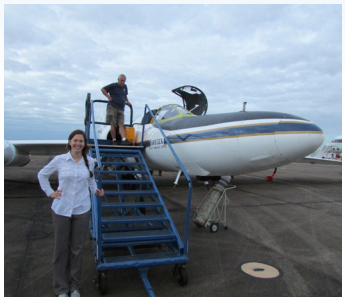
The Institute furthers the goal of JPFP and MUREP by exposing these scholars and over 1,100 DSP scholars and graduates, mentors and speakers to the nation's largest gathering of racial and ethnic minority Ph.D. scholars who are seeking faculty careers in higher education. Since 1994, the meeting has addressed the minority faculty shortage by providing doctoral scholars with the resources they need, including peer and faculty mentoring, networking, professional development and recruitment.

Significance to the SREB Region

Each scholar in this publication attends a higher education institution in the SREB region. This publication also includes scholars who represent states outside of the region who have attended the Institute. All are members of JPFP and programs that comprise MUREP.

JPFP, MUREP and the Institute provide resources for these students to excel in the STEM workforce and to produce ideas, methods and research that empower their respective academic and geographic communities. The success of the partnership, in part, speaks to the success and favorable outcomes of the scholars.

Georgia



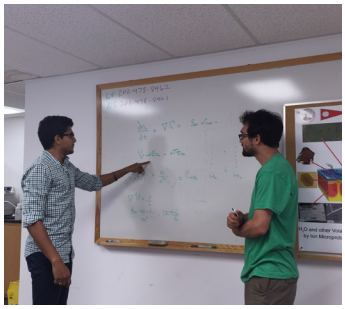
Mariel D. Friberg

Georgia Institute of Technology, Atlanta
Environmental Engineering

Mariel is developing and evaluating a method for fusing ambient monitor measurements and chemical transport model simulations to estimate daily concentrations of 12 air pollutants across five metropolitan cities. Her research at NASA's Goddard Space Flight Center involves relating aerosol-type and column aerosol optical depth from satellite observations to surface fine particulate matter for air quality purposes. The specific goal of her doctoral research is to provide better air quality metrics to epidemiologists for use in health assessments.

Friberg describes the experience she has had with NASA: "The Jenkins fellowship has empowered me to become a scientific researcher in the fields of atmospheric science and environmental engineering. The fellowship provided me the opportunity to be involved with the Institute and network with supportive colleagues who helped me meet the world's top scientists in my field."

Maryland



Pratik Saripalli

University of Maryland, College Park
Aerospace Engineering

Pratik Saripalli is helping NASA not only to see the stars, but to "go green" while doing it. He is focused on developing nitrous oxide as a green mono-propellant, which can guide NASA to more sustainable propellants. His research is designed to understand the kinetics of nitrous oxide decomposition and to figure out if any stable states of nitrous oxide exist. The goal is to isolate these states and possibly use these excited states to create a more energy efficient path. Saripalli's research has taken place at the Space Power and Propulsion Laboratory at the University of Maryland, College Park. His work at the NASA Goddard Space Flight Center helps to establish measures that improve the safety and longevity of the equipment NASA uses for space missions.

Saripalli says, "The Jenkins fellowship has provided me with many opportunities to interact with my fellow peers and numerous NASA mentors who have guided me in my academic endeavors."

North Carolina

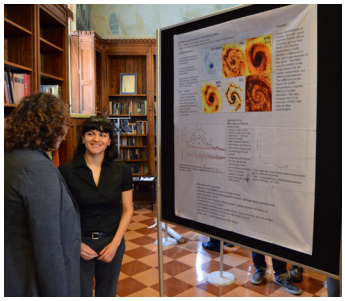
Kelechi Ikegwu

North Carolina Agricultural and Technical State University, Greensboro
Computer Systems Technology

Kelechi received the NASA MUREP Scholarship at the beginning of his sophomore year in college. He was one of only 10 selected, and he immediately chose to work hard in hopes of the fellowship being renewed the next year. His sophomore summer internship at the NASA Ames Research Center in Moffett, California, and guidance from NASA mentor Dr. Rodney Martin, computer engineering and research scientist, helped to propel Kelechi into his interest in STEM fields.

Kelechi is currently investigating new brain-based computing structures and calculations that are derived from realistic modeling of the mammalian cerebral cortex. He credits NASA with introducing him to effective research practices and helping him to build tools that push society further into innovation. Kelechi plans to enroll into a Ph.D. program in computer science.

Tennessee



Laura D. Vega

Vanderbilt University, Nashville, Tennessee
Physics and Astronomy

Laura Vega spends much of her time looking skyward. Laura studies a mysterious set of stars known as RV Tauri Variables. These stars are very bright, with fluctuating luminosity levels. This class of stars was discovered over 75 years ago, yet their origin is unknown. Vega's research goal is to better understand these stars and determine their role in stellar evolution. She is conducting an in-depth study of the RV Tauri star, DF Cygni, as a test case for the entire set by using long and highly resolved unprecedented observations from the NASA Kepler Telescope.

Being a recipient of the NASA Harriett G. Jenkins Graduate Fellowship helped Vega advance in her journey toward obtaining a Ph.D. The award also keeps her from having to worry about financial struggles so that she can focus completely on her research and studies.

Texas

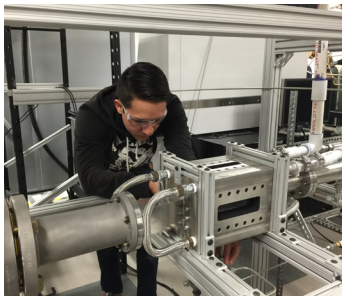
Ezgihan Baydar

The University of Texas at Arlington
Mechanical and Aerospace Engineering

Guidance from Frank Lu, professor and head of the department of mechanical and aerospace engineering at the University of Texas, inspired Ezgihan Baydar to enter a contest for a NASA project scholarship. Baydar was awarded a $135,000 fellowship and NASA internships to help her continue her study of ignition jet engines and gas dynamics. Her current project studies the external-compression inlets inside turbine engines. The purpose of the inlet is to capture the required airflow with maximum efficiency and minimal distortion. This work will give NASA insight into creating the most efficient and modern supersonic jet engines.

In 2013, Baydar was awarded the Harriett G. Jenkins Graduate Fellowship, and she describes the environment at NASA as "inspiring and motivational." She is grateful for the opportunity to network with NASA professionals who have strengthened her technical skills and interest in a research career. She intends to work for NASA through graduation.

Texas



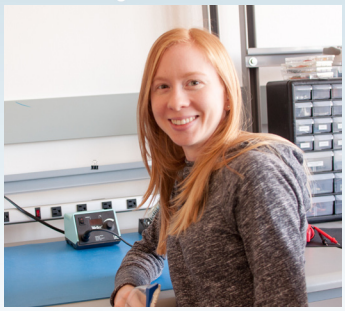
Arturo Acosta-Zamora

University of Texas at El Paso
Mechanical Engineering

NASA could not operate as normal without engines, propulsion or combustor technologies. It depends on people like Arturo Acosta-Zamora who have a passion for these elements to help NASA conduct missions and research. Acosta-Zamora received the MUREP Institutional Research Opportunity at NASA. His past studies center on the design of combustor systems in compressible, turbulent and premixed conditions to better understand the subsystems of air handling and preparation, instrumentation and controls, and the combustor. These studies will help deepen the understanding of how combustion systems react in various settings and states — a topic that is paramount for NASA's engineers and propulsion equipment.

Acosta-Zamora acknowledges how NASA's support helped him become familiar with the aerospace industry through internship, scholarship and educational opportunities. He has worked with NASA experts in the engineering field and gained knowledge that would be difficult to obtain elsewhere.

Texas

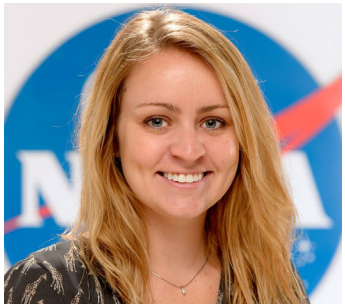


Kelley Hashemi

The University of Texas at Austin
Aerospace Engineering and Engineering Mechanics

Efficient flight vehicle design is a notable component of NASA's mission. Kelley Hashemi is working with NASA to further the use of lightweight aircraft to conserve fuel during flight. She is developing a new control design for the flexible wing X-56A aircraft. The X-56A was originally developed by Lockheed Martin for the U.S. Air Force to explore extended, high altitude flight technologies. NASA is using the aircraft to develop advanced control techniques for lightweight, flexible aircraft. Hashemi is helping to create an adaptive design that incorporates non-adaptive elements to retain some of the stability properties offered by classical design methods. Hashemi believes the NASA fellowship has given her the financial freedom to explore a research topic she is excited about. She has also gained valuable connections and feels as if she has made an impact beyond academics.

Texas



Josephine Cunningham

The University of Texas at Austin
Chemistry

Rockets, fuel and engines are vital to NASA's work. However, the people who create and use the equipment are just as important. Josephine Cunningham has helped to develop the "NoSlip," a paper analytical device that can help medical professionals or the general public easily diagnose diseases or health issues. Cunningham looked to pregnancy tests and blood glucose meter tests as inspiration for the development of the "NoSlip." She currently has three patents and has contributed to multiple publications related to point-of-need diagnostic tests like the "NoSlip." Cunningham credits NASA with elevating her graduate career through extended collaborations and additional opportunities. She has received numerous awards from the University of Texas at Austin, the Society for Electroanalytical Chemistry and the Electrochemical Society.

Texas

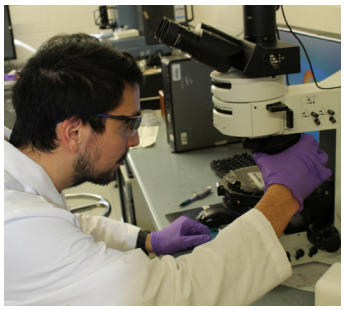
Brandon Wilson

The University of Houston-Victoria, Victoria, Texas
Computer Science

Brandon Wilson is an expert on all things virtual and robotic. His research interests include computer vision, artificial intelligence, digital gaming and virtual reality. His past work has been with parallelized foreground detection, which aims to detect, classify and recognize real objects in virtual images. This work has helped further innovation of the motion capture of hand gestures. An experiment used a leap motion sensor to track hand and finger movements, while simultaneously showing real-time virtual movement. As a result, Wilson and colleagues were able to add specific hand location and orientation data that are vital in creating an immersive and virtual environment.

Wilson is creating digital architecture for higher-level operations of robotic platforms that use virtual reality. He credits NASA with giving him support to continue his education.

Texas



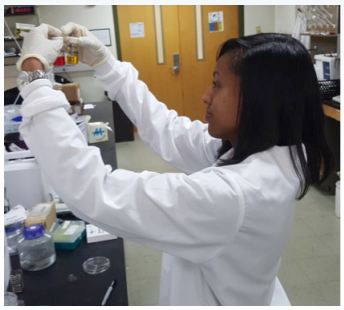
Spencer Hawkins

Texas A&M University, College Station, Texas
Materials Science and Engineering

In order to push the limits of aviation and space exploration, NASA requires equipment with reduced weight, improved fracture toughness and conductive properties. Spencer Hawkins understands this and has dedicated his scholarly research to studying epoxy nanocomposites and carbon fiber reinforced composites (CFRCs) in the materials science and engineering department at Texas A&M University. His research focuses on developing multifunctional epoxy nanocomposites that can be used as interleaves, a thin layer of material placed between two plies of carbon fiber to improve the mechanical, fracture, and electrical performance of CFRCs for use in the aerospace, automotive and sports industries.

Hawkins acknowledges that being a recipient of the NASA Harriett G. Jenkins Graduate Fellowship has allowed him to pursue his own research goals as he establishes working relationships with various personnel at the NASA Glenn Research Center in Cleveland, Ohio. Hawkins believes attending the Institute on Teaching and Mentoring gave him valuable information he has been able to apply to his research.

Virginia



Erin Jenrette

Norfolk State University

Materials Science and Engineering

Technology has granted society the tools to make major advances in today's medical and health fields. Erin Jenrette is looking to take medical innovation even further. She is working on a way to create non-invasive diagnosis testing to catch early signs of disease. The goal is to detect biochemical changes in bodily fluids, while avoiding the need for biopsies. Graphene Oxide (GO) is a material that is a compound of carbon, oxygen and hydrogen that could be an alternative for detecting the presence of diseases in blood. The compound has a large surface area, high thermal and electrical conductivity, stability and the means to strongly bond to protein molecules, which are essential to tracking bio-molecules that may house diseases with low detection limits. Jenrette wants to ultimately combine GO with Quantum Dots (QDs), whose bright fluorescent molecules allow for biological imaging, visual aids and bio-sensing. The combination of GO and QDs could allow for sensitive detection of diseases.

Jenrette credits NASA with giving her the opportunity to gain more exposure in her field and collaborate with other students and professionals.

NASA Harriett G. Jenkins Pre-Doctoral Fellowship Project and Minority University Research and Education Project

The Harriett G. Jenkins Pre-doctoral Fellowship Program is a part of NASA's Minority University Research and Education Project. NASA introduced JPFP in 2000 to facilitate the development of a more inclusive, multicultural and sustainable workforce for underrepresented groups of people in STEM.
The goals of the project:

- Develop science, technology and engineering expertise in ethnic and gender groups that are considered underserved and underrepresented in the STEM workforce
- Offset financial barriers for students underrepresented in STEM fields pursuing a graduate education
- Provide hands-on research experience at NASA Centers
- Expose students to the salient aspects of professional and career development
- Develop students' skill sets and competence in applied science and engineering by providing collective and individual outreach opportunities to the K-16 educational community.

2014 Institute NASA Attendees

2015 Institute NASA Attendees

NASA MUREP and JPFP Institute on Teaching and Mentoring Attendees, 2013-2015

Alaska
Christina Seiman Chu, University of Alaska Fairbanks, Space Physics

Arizona
Christopher W. Sorini, Arizona State University, Mechanical Engineering

Arkansas
Erika Kohler, University of Arkansas, Space and Planetary Sciences

California
Fernando Gomez, California State University, Los Angeles, Computer Science

Colorado
Jessica Kenigson, University of Colorado Boulder, Atmospheric and Oceanic Sciences

Connecticut
Eleanor C. Stokes, Yale University, Urbanization and Global Change

Florida
Leigh Nash, University of Central Florida, Mechanical Engineering

Georgia
Mariel D. Friberg, Georgia Institute of Technology, Environmental Engineering

Idaho
Sheenah Lynn Bryant, Boise State University, Biomolecular Sciences

Maryland
Pratik Saripalli, University of Maryland, College Park, Aerospace Engineering

Massachusetts
Adam Sarafian, Woods Hole Oceanographic Institution and Massachusetts Institute of Technology, Cosmochemistry,

Mississippi
Robert L. Smith, Jackson State University, Computer Engineering

New Hampshire
Mackenzie L. Jones, Dartmouth College, Physics and Astronomy

New Mexico
Kathryn Steakley, New Mexico State University, Astronomy

New York
Rai Munoz, City College of New York, Electrical Engineering

North Carolina
Kelechi M. Ikegwu, North Carolina Agricultural and Technical State University, Electronics Technology

Ohio
Jendai E. Robinson, University of Cincinnati, Physical Analytical Chemistry

Bradley Rodier, Case Western Reserve University, Chemistry

Puerto Rico
Raul Acevedo, University of Puerto Rico, Rio Piedras, Chemical Physics

Perla E. Cruz Tato, University of Puerto Rico, Rio Piedras, Analytical Chemistry

Daysi Diaz-Diestra, University of Puerto Rico, Rio Piedras, Chemistry

Wilmer O. Rivera De Jesús, University of Puerto Rico, Rio Piedras, Environmental Sciences

Keyla T. Soto Hidalgo, University of Puerto Rico, Rio Piedras, Environmental Chemistry

Tennessee
Teresa Monsue, Vanderbilt University, Astrophysics

Laura D. Vega, Vanderbilt University, Physics

Texas
Arturo Acosta-Zamora, University of Texas at El Paso, Mechanical Engineering

Ezgihan Baydar, University of Texas at Arlington, Aerospace Engineering

Luz Bugarin, University of Texas at El Paso, Environmental Science and Engineering

Josephine Cunningham, University of Texas at Austin, Analytical Chemistry

Kelley Hashemi, University of Texas at Austin, Aerospace Engineering

Spencer Hawkins, Texas A&M University, Materials Science and Engineering

Brandon Wilson, University of Houston-Victoria, Computer Science

Virginia
Erin Jenrette, Norfolk State University, Materials Science

Washington D.C.
Emmaris Soto, Catholic University of America, Physics

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