NASA Harriett G. Jenkins Graduate Fellowship Program (JGFP)

FY 2016 ANNUAL PERFORMANCE REPORT

FUNDING SOURCE:
OFFICE OF EDUCATION
MUREP

LINE OF BUSINESS:
NASA Internships, Fellowships and Scholarships (NIFS)

MANAGING ORGANIZATION:
NASA Ames Research Center
Office of Education and Public Engagement

ACTIVITY MANAGER:
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ACTIVITY DESCRIPTION

NASA provides financial assistance (grants and cooperative agreements) to the Nation's Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs), Tribal Colleges and Universities (TCUs), American Indian and Alaskan Native Serving Institutions (AIANSIs), Predominantly Black Institutions (PBIs) and eligible community colleges. The Administration recognizes the valuable role that these institutions play in educating our citizens, as reflected in the five Minority-Serving Institutions (MSI) focused Executive Orders signed by the President.

NASA's Minority University Research and Education Activity (MUREP) investments enhance the research, academic, and technology capabilities of MSIs through multi-year awards. Awards assist faculty and students in research and provide authentic STEM engagement related to NASA missions. These competitive awards provide NASA specific knowledge and skills to learners who have been historically underrepresented and underserved in STEM. MUREP investments also assist NASA in meeting the goal of a diverse workforce through student participation in internships, scholarships, and fellowships at NASA Centers and JPL.

The NASA Harriett G. Jenkins Graduate Fellowship Program (JGFP) is a competitive fellowship that focuses on underserved and underrepresented students in the Science, Technology, Engineering, and Math (STEM) disciplines, thereby addressing the critical shortage of qualified STEM professionals that the nation is facing. Underrepresented and underserved groups within a STEM include (but are not limited to) women, ethnic minorities and persons with disabilities, and veterans. The Fellowship is funded by the Minority University Research Education Programs (MUREP) through the NASA Office of Education. Funding is provided for up to three years towards the pursuit of a NASA-related graduate STEM degree.

ACTIVITY GOALS

Jenkins Graduate Fellowship Program addresses the following FY16 Annual Performance Indicator (API):

- Strategic Objective 2.4:
    - Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers, and faculty in NASA's missions and unique assets.

- Performance Goal 2.4.1:
    - Assure that students participating in NASA higher education projects are representative of the diversity of the Nation.
        - ED-15-1: Provide significant, direct student awards in higher education to (1) students across all institutional categories and levels (as defined by the U.S. Department of Education); (2) racially or ethnically underrepresented students, (3) women, and (4) persons with disabilities at percentages that meet or exceed the national percentages for these populations, as

determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics for a minimum of two of the four categories.

The CoSTEM priorities that are indirectly supported by are:

- **Enhance STEM Experience of Undergraduate Students:** Graduate one million additional students with degrees in STEM fields over the next ten years
- **Design Graduate Education for Tomorrow's STEM Workforce**: Provide graduate level trained STEM professionals with basic and applied research expertise, options to acquire specialized skills in areas of national importance and mission agency's needs, and ancillary skills needed for success in a broad range of careers (p. viii).
- **Better Serve Groups Historically Underrepresented in STEM Fields:** Increase the number of students from groups that have been underrepresented in STEM fields that graduate with STEM degrees in the next 10 years and improve women's participation in areas of STEM where they are significantly underrepresented.

ACTIVITY BENEFIT TO PERFORMANCE GOALS

FY 2016 Performance Goals: 2.4.1: Assure that student participating in NASA higher education projects are representative of the diversity of the Nation.

Jenkins Graduate Fellowship Program 2013 Cohort

- 67% are female
- 57% of students self-identified as minorities:
  - 17% African American;
  - 3% American Native or Alaskan American;
  - 10% Asian;
  - 27% Hispanic or Latino
- Minority Serving Institutions
  - New Mexico Institute of Mining and Technology – HSI
  - University of Alaska, Fairbanks – AIANSI
  - University of Arkansas – AIANSI
  - University of Maryland, College Park - AANAPSI
  - University of Massachusetts, Boston - AANAPSI

Jenkins Graduate Fellowship Program 2015 Cohort

- 69% are female
- 40% of students self-identified as minorities:
  - 8% African American;
  - 8% American Native or Alaskan American;
  - 16% Hispanic or Latino;
  - 8% Veteran.
- Minority Serving Institutions
  - Arizona State University – AIANSI
  - New Mexico State University – AIANSI, HSI

- Norfolk State University – HBCU
- University of California, Merced – AANAPISI
- University of Houston, Victoria – AANAPISI, HSI
- University of Puerto Rico, Rio Pedras – HSI
- Fisk / Vanderbilt University, Ph.D. Bridge Program – HBCU

Jenkins Graduate Fellowship Program 2016 Cohort

- 75% are female
- 38% of students self-identified as minorities:
  - 13% African American;
  - 26% Hispanic or Latino;
- 13% Veteran.
- Minority Serving Institutions
  - University of Texas, El Paso– HSI

ACTIVITY ACCOMPLISHMENTS

MUREP sponsored 14 NASA Harriett G. Jenkins Graduate Fellows attendances at the 2016 Institute on Teaching and Mentoring sponsored by Southern Regional Education Board (SREB) that was held on October 27- 30, 2016 at the Tampa, Florida.

NASA Harriett G. Jenkins Graduate Fellowship Program 2013 Cohort graduated 3 Fellows with Master's degrees and 5 Fellow with a Doctoral degree in FY16. Three of the Ph.D. graduates received NASA Postdoctoral Fellowships.

- Dr. Kelley E. Hashemi received her Doctor of Philosophy from the New Mexico Institute of Mining and Technology. She is participating in research at NASA Ames Research Center in the Intelligent Systems Division. Dr. Hashemi research is in Reference System Manipulation for Performance-Focused Adaptive Control.

- Dr. Mera F. Horne completed her Doctor of Philosophy at the University of California – Berkeley in Mechanical Engineering. She is participating in research at NASA Ames Research Center in The Icebreaker Sample Handling System Ð NextGen SPU project.

- Dr. Erika Kohler received her Doctor of Philosophy from the University of Arkansas is Space and Planetary Sciences. Dr. Kohler is a researcher at NASA Goddard Space Flight Center working on the Experimental Determination of Mineral Stability with Applications to Refractory Cloud Formation in Extrasolar Planetary Atmospheres and Brown Dwarfs.

Josephine Cunningham-Hofstetter received her Doctor of Philosophy in Analytical Chemistry from The University of Texas at Austin in May 2016. She accepted a position as Research Director at Access Sensor Technologies. Access Sensor Technologies is a new company that focuses on the development of inexpensive and accurate environmental and biological tests that can be used by everyone.

ACTIVITY CONTRIBUTION TO ANNUAL PERFORMANCE INDICATORS (APIs)

FY 2016 Annual Performance Indicators

ED-16-1: Provide significant, direct student awards in higher education to (1) students across all institutional categories and levels (as defined by the U.S. Department of Education); (2) racially or ethnically underrepresented students, (3) women, and (4) persons with disabilities at percentages that meet or exceed the national percentages for these populations, as determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics for a minimum of two of the four categories.

- In 2016, NASA Harriett G. Jenkins Graduate Fellowship Program (JGFP) funded 46 students at a cost of $1,643,250.

ACTIVITY IMPROVEMENTS MADE IN THE PAST YEAR

The NASA Harriett G. Jenkins Graduate Fellowship Program (JGFP) participated in the release the NASA Education Aeronautics Scholarship and Advanced STEM Training and Research (AS&ASTAR) Fellowship solicitation in 2016. and received 86 proposals of which 8 were selected for MUREP funding. The system change has increased the efficiency of the proposal application collection, evaluations, selection and funding processes.

ACTIVITY PARTNERS AND ROLE OF PARTNERS IN ACTIVITY EXECUTION

Students attend MSI and the funds are provided to the institutions via training grants.

Jenkins Graduate Fellowship Program 2013 Cohort		
Institution	**Fellow**	**Proposal Title**
Brown University	Lauren Jozwiak	Intrusive Magnetism on the Moon and Mercury: Comparisons of Magma Degassing Processes, Styles of Intrusions, and Insights on Observed Surface Morphologies
Case Western Reserve University	Bradley Rodier	Fusion of Multi-angle Remote Sensing Imagery and Lidar to Determine Structure in Coastal Mangroves and Tropical Forests
Florida A & M State University	Faheem Muhammed	Development of Novel Magnetic Composites
Georgia Institute of Technology	Mariel Frieberg	Paper Electrochemical Device for Detection of DNA and Thrombin by Target-Induced Conformational Switching
New Mexico Institute of Mining and Technology	Hilary Kelly	Insect-Sized - Mobile Robots
Rensselaer Polytechnic Institute	Katrina Bermudez	Noble Gases and Planetary Evolution
Rice University	Amelia Hart	Novel Ceramic Fiber Matrix Composites for Mechanical, Thermal, and Electrical Applications

Texas A & M University	Stephen Hawkins	Active/Adaptive Flexible Motion Control with Aeroservoelastic System Uncertainties
The Catholic University of America	Emmaris Soto	Star-Forming Clumps and the Evolution of Galaxies in the UV HUDF
The University of Texas at Austin	Kelley Hashemi	Mechanics of the interaction between the drill bit and rocks interface
University of Alaska, Fairbanks	Christina Chu	Based Rapid Bacterial Detection System
University of Arkansas	Erika Kohler	Mineral Stability Under Simulated Venusian Conditions with Implications for the Venusian Radar Anomalies
University of California - Berkeley	Mera Horne	Significantly Enhanced Mechanical Performance of Epoxy Thin Films with Well-exfoliated Multi-walled Carbon Nanotube
University of Cincinnati- Main Campus	Jendai Robinson	The Fabrication and Characterization of Gold Arrays Using Nano-porous Alumina Templates: A Pilot Project
University of Colorado at Boulder	Christine Fanchiang	Data-Driven Data Query and Presentation Research
University of Colorado at Boulder	Jessica Kenigson	Coastal Sea Level Rise in a Warming Climate: Ocean General Circulation and Hydrodynamic Modeling Using Multi-Satellite Data
University of Maryland, College Park	Pratik Saripalli	Star-Forming Clumps and the Evolution of Galaxies in the UV HUDF at $0.5<z<1.5$
University of Massachusetts, Boston	Edward Saenz	Structural Evaluation of Frame-Stiffened Composite Panels
University of Southern Mississippi	Jessica Piness	The Fabrication and Characterization of Gold Arrays Using Nano-porous Alumina Templates: A Pilot Project
University of Texas at Arlington	Ezgihan Baydar	Micro-vortex generators (MVGs) for streamline-traced inlets
University of Texas at Austin	Nicholas Brenes	Nuclear Thermal Propulsion Systems: Evaluating Past and Present Effluent Treatment Systems
University of Texas at Austin	Josephine Cunningham	Novel Ceramic Fiber Matrix Composites for Mechanical, Thermal, and Electrical Applications
Vanderbilt University	Teresa Monsue	Investigating P-Mode Oscillations in Solar Chromospheric Active Regions
Woods Hole Oceanographic Institution/MIT	Adam Sarafian	Systems Engineering Support for The Development of the NEXT Thruster Power Processing Unit (PPU)
Yale University	Eleanor Stokes	Analysis of Urbanization Dynamics using the Suomi-NPP VIIRS Day/Night Visible Band

Jenkins Graduate Fellowship Program 2015 Cohort		
Institution	**Fellow**	**Proposal Title**
Arizona State University	Chris W. Sorini	High-Fidelity Modeling and Analysis of Advanced Polymer Matrix Composites Subjected to Impact/Dynamic Loading
Boise State University	Sheenah L. Bryant	Microgravity-Induced Modulation of Ca2+ Transport Mediated by TRPV4 as a Risk Factor for Osteoporosis
Boise State University	Anne Marie Raymondi	Lidar remote sensing to measure fire-prone invasive weed distribution and plant community structure along elevation gradients in dry land systems.
Dartmouth College	Mackenzie L. Jones	Modeling the evolution of galaxies and black holes in X-rays with NuSTAR and Chandra
Fisk - Vanderbilt University	Laura D. Vega	Stellar Evolution at the Crossroads: The True Colors of RV Tau Variable Stars
New Mexico State University	Kathryn Steakley	Exploring Impact Heating of the Early Martian Climate
New Mexico State University	Alexander Thelen	The Chemical History and Evolution of Titan's Atmosphere as Revealed by ALMA
Norfolk State University	Erin Jenrette	Lab-on-a-chip Nanosensor to Determine the Effect of Space Flight on the Incidence of Cardiovascular Risk Factors and Diseases
Texas A&M University	Andrew C Weems	Development of multifunctional smart coatings for corrosion detection and control
University of California, Merced	Grewal Simranjit	Parametric and mechanistic study of doped graphene variants for oxygen reduction catalysis
University of Central Florida	Leigh Nash	Aviation Fuel Characterization
University of Houston - Victoria	Brandon J. Wilson	Autonomous Cargo Manipulation using Parallelized Visual Odometry
University of Puerto Rico, Rio Pedras	Perla E. Cruz Tato	On the design and fabrication of a dual-purpose forward osmosis membrane with anti-biofouling and catalytic activity: A wastewater reclamation approach

Jenkins Graduate Fellowship Program 2016 Cohort		
Institution	**Fellow**	**Proposal Title**
Brown University	Ariel Nolan Deutsch	Analysis of Polar Deposits on Mercury and the Moon
Colorado School of Mines	Caitlin M. Crawford	Advanced Thermoelectric Materials for Space Power Applications
Drexel University	Rebecca Anne Phillipson	Investigating the Relationship between Black-Hole Binaries and Active Galactic Nuclei
Iowa State University	Elspeth Petersen	High-Performance Catalysts for the Reduction of CO2 and Trash-Derived Gas: Advancing ISRU Technologies to Fuel the Missions to Mars
University of Colorado	Margaret Maria Rybak	Navigating CubeSats with One-Way Radiometric Tracking
University of Michigan	Krystal L. Acosta	Characterizing Pyroelectric Effects of Macro-Fiber Composites
The University of Texas at El Paso	Robert E. Ferguson	Combustion Joining of Regolith Tiles for the In-Situ Fabrication of Landing/Launching Pads
University of Virginia	Spencer Stebbins	Three-Dimensional Unsteady Swept Icing Aerodynamics

REFERENCES