

**NASA Harriett G. Jenkins Pre-Doctoral Fellowship Project (JFPF)
Annual Progress Report: 2011**

Grant # NNX10AU20A

Administered by UNCF Special Programs Corporation

Type of Agreement: Grant/Cooperative Agreement

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PROJECT DESCRIPTION

The Harriett G. Jenkins Pre-doctoral Fellowship Project was established through a cooperative agreement between NASA Headquarters' Office of Opportunity Programs and the UNCF Special Programs Corporation (UNCFSP) in September 2000. The project is named in honor of Dr. Harriett G. Jenkins, the former Assistant Administrator of Equal Opportunity Programs. Dr. Jenkins has made significant contributions to the Nation's aerospace industry and technical workforce. Her dedication to institutions of higher education through the support and development of numerous programs designed to build institutional research capabilities has increased the number of women, minorities, and disabled persons with post-baccalaureate degrees in the science, technology, engineering, and mathematics (STEM) disciplines and their participation in the NASA-sponsored research and education community.

Furthering the work of Dr. Harriett G. Jenkins, the JFPF has increased the number of women, minorities, and persons with disabilities participating in the Science, Technology, Engineering, and Mathematics (STEM) workforce, thereby helping to eliminate the shortage of skilled workers in STEM-related disciplines. Each year, approximately 20 three-year fellowships have been awarded to support underserved and underrepresented STEM graduate students, providing a stipend and tuition offset support. Since the program's inception in September of 2000, 209 students have been awarded fellowships.

PROJECT GOALS

Goal 1: Increase the number of underrepresented minority graduate students prepared to enter the STEM workforce.

Objective 1.1: Annually, provide tuition assistance and stipend support for a maximum of 20 underrepresented students in pursuit of Master's and Doctoral degrees in NASA-related disciplines.

Objective 1.2: Annually, provide a 10-week, hands-on research experience at a NASA Center.

Objective 1.3: Provide two (2) professional and career development activities within the first two years of fellowship tenure.

Objective 1.4: Coordinate an annual symposium event designed to promote networking collaboration, and information exchange amongst project constituents and relevant NASA stakeholders.

Goal 2: Develop student's skill sets and competency in applied science and engineering by providing collective and individual outreach opportunities.

Objective 2.1: At the end of the Year-1 professional development workshop, assign a policy-based real life, open-ended issue/problem to Cohorts that directly or indirectly impacts NASA.

Objective 2.2: At the end of their Year-3 tenure, fellows will present group project findings to their peers and relevant NASA stakeholders during the annual symposium event.

PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

UNCFSP has worked closely with NASA since 2000 to meet NASA's vision to inspire, engage, educate and employ. The JFPF addresses two education goals from NASA's 2006 Strategic Plan, and serves as a major link in the student pipeline:

- Strengthening NASA and the Nation's future workforce
- Attracting and retaining students in the STEM disciplines

The JFPF has achieved these two goals by increasing the number of women, minorities, and persons with disabilities participating in the Science, Technology, Engineering, and Mathematics (STEM) workforce, thereby helping to eliminate the shortage of skilled workers in STEM-related disciplines. Each year, approximately 20 three-year fellowships have been awarded to support graduate students, including a stipend and tuition offset support. Since the program's inception in September of 2000, 209 students have been awarded fellowships.

PROJECT ACCOMPLISHMENTS (CONNECTION BACK TO ANNUAL PERFORMANCE GOALS AND PLANS)

Since the program's inception in 2000, JFPF has continued to meet outcome 1 & 2 of NASA's education strategic framework by increasing the number of women, minorities, and persons with disabilities participating in the Science, Technology, Engineering, and Mathematics (STEM) workforce, thereby helping to eliminate the shortage of skilled workers in STEM-related disciplines.

There has been:

- 209 Fellows to date in the program
- 89 have received PhDs (3 during this fiscal year)

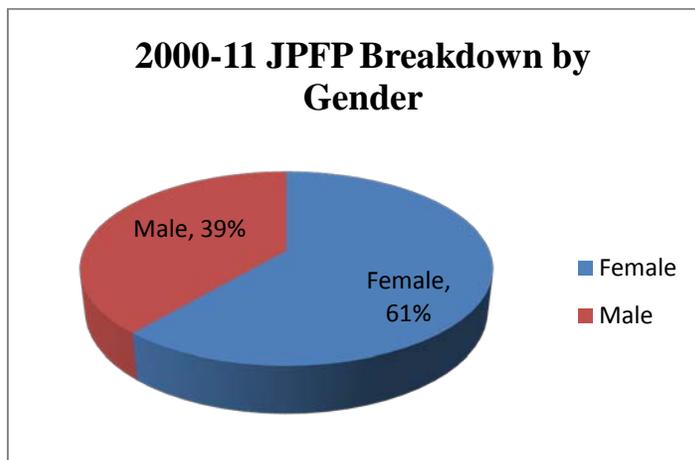
- 46 have received M.S. (1 during this fiscal year)
- 17 have confirmed that they are currently working at NASA (7 are conducting Post-Doctoral Research and 10 are working at a NASA Center and employed by either NASA or a contractor)
- 81 males; 128 females
- 53 pursued their JPDFP sponsored PhDs at Minority Institutions; 33 from HBCUs; 11 from Hispanic Serving Institutions; and 8 from other minority institutions
- 13 pursued their JPDFP sponsored MS at Minority Institutions; 9 from HBCUs; 1 from a Hispanic Serving Institution; and 3 from other minority institutions
- 13 NASA Ambassadors since 2008
- 10 selected to present their research findings at the International Aeronautical Congress in Capetown, South Africa

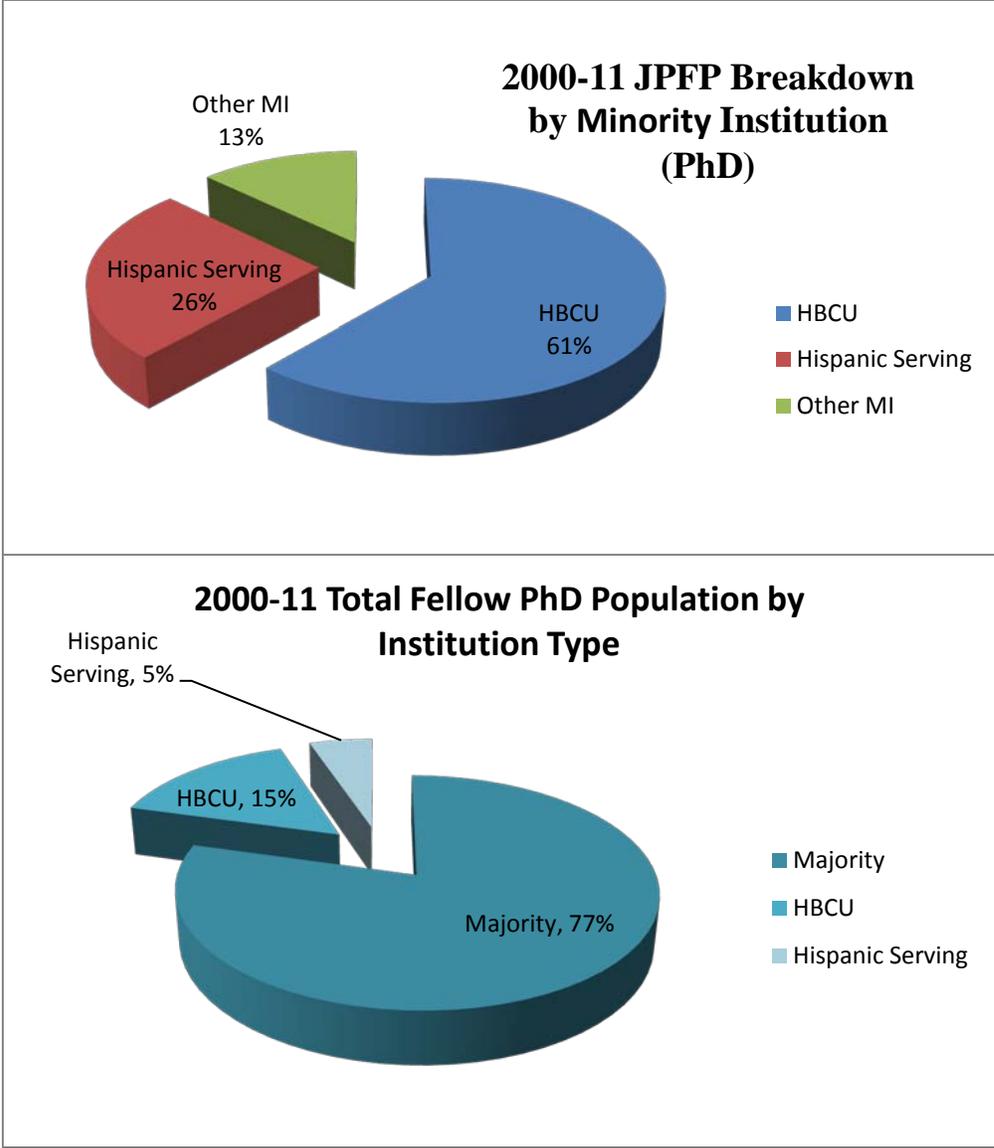
Fellows conducting Post-Doctoral Research at NASA

Fellow Name	Cohort	Institution	NASA Center
Lakesha Bates	2	University of Central Florida	Goddard
Amber Straughn	5	Arizona State University	Goddard
Ana De La Ree	6	University of California-Irvine	Glenn
Moogega Cooper	6	Drexel University	JPL
Serina Diniega	7	University of Arizona	JPL

Fellows working at NASA

Fellow Name	Cohort	NASA Center	Title
Carrie Anderson	1	Goddard	Associate Chief, Planetary Systems Laboratory
Ramsey Smith	2	Goddard	Space Scientist, Sciences and Exploration Directorate
Shavesha (Anderson) Rutledge	3	Goddard	Aerospace Engineer
Jessica Marquez	3	Ames	Research Engineer, Human Systems Integration
Omar Mireles	3	Marshall	Engineer, Nuclear Systems Group
Lora Koenig	4	Goddard	Physical Scientist, Cryosphere Science Research
Ravi Prakash	4	JPL	Aerospace Engineer
Mamta Patel	4	Johnson	Engineer
Miguel Roman-Colon	4	Goddard	Research Physical Scientist
Emmanuel Murray	5	JPL	Associate Engineer
Elizabeth Deems	5	JPL	Systems Engineer
Quenton Bonds	6	Goddard	Research Electronics Engineer





JFPF Fellows serving as NASA Ambassadors

Fellow Name	Cohort	Institution
Quenton Bonds	6	University of South Florida
Moogega Cooper	6	Drexel University
Serina Diniega	7	University of Arizona
Brandon Jones	7	Cornell University
Erin Burke	8	University of Washington-Seattle
Shanna-Shaye Forbes	8	University of California- Berkeley
Jonathan Gaines	8	Virginia Polytechnic Institute and State University
Kennda Lynch	8	Colorado School of Mines

Levica Smith	8	Texas A&M University
Shannon Tronick	8	Princeton University
Sherrisse Kelly Bryant	9	Louisiana State University
Marsha Cole	9	Louisiana State University
Matthew Smith	9	Massachusetts Institute of Technology

JFPF Fellows accepted for the 62nd International Aeronautical Congress

Fellow Name	Cohort	Institution
Kennda Lynch	8	Colorado School of Mines
John Rigueur	8	Vanderbilt University
Akibi Archer	9	Georgia Institute of Technology
Lourdes Medina	9	Penn State
Christopher Skipwith	9	University of Pennsylvania
Damaris Suazo	9	University of Puerto Rico-Rio Piedras
Patricia Voll	9	Stanford University
Miraida Pagan Castillo	10	University of Puerto Rico- Rio Piedras
Dionne Hernandez Lugo	10	University of Puerto Rico – Rio Piedras
Kimberly Trent	10	University of Michigan

PROJECT CONTRIBUTIONS TO PART MEASURES (INCLUDE DATA PLUS EXPLANATION)

For the period: October 1, 2010 through September 30, 2011

Objective 1.1: 20 underrepresented graduate students received tuition and stipend support (Cohort 11).

Cohort 11				
Alexander II	Robert	University of Michigan-Ann Arbor	Technology- Systems Eng./Design	PhD
Almeida	Eduardo	Brown University	Engineering-Electrical Engineering	PhD
Bastien	Fabienne	Vanderbilt University	Science-Astronomy	PhD
Carpena	Jennifer	University of Puerto Rico - Rio Piedras	Science-Physics	PhD
Cavitt	Maurice	The University of Texas at Arlington	Engineering-Industrial Engineering	PhD
Cintron-Rivera	Jorge	Michigan State University	Engineering-Electrical Engineering	PhD
Dhingra	Neil	University of Minnesota-Twin Cities	Engineering-Electrical Engineering	PhD
Foster	Deatrick	Vanderbilt University	Science-Physics/Science- Astronomy	PhD
Galenas	Miriam	University of Maryland-College Park	Earth Sciences Technology-Comp. Science	PhD
Hixson	Katharine	Nova Southeastern University	Science-Physical Science	PhD
Kataria	Tiffany	University of Arizona	Science-Astronomy	PhD
Morley	Caroline	University of California-Santa Cruz University of Puerto Rico-Rio Piedras	Science-Astronomy	PhD
Nicolau	Eduardo	Campus	Science-Chemistry	PhD
Peaslee	David	University of Missouri-St. Louis	Science-Physics	PhD
Proventud- Estrada	Carlos	University of Puerto Rico - Rio Piedras	Physics	PhD
Rivers	Derick	Virginia Commonwealth University	Mathematics-Applied Mathematics	PhD
Udom	Innocent	University of South Florida	Engineering-Chemical Engineering	PhD
Upton	Kathleen	California Institute of Technology	Science-Chemistry	PhD
Velez Gonzalez	Jose	University of Kansas	Science-Earth Sciences	PhD
White	Lauren	University of California-Santa Barbara	Science-Chemistry	PhD

Objective 1.2: 19 have been selected to participate in the 2011 JFPF Center Based Research Experience (CBRE), formally known as the Mini-Research Award (MRA). The CBRE is a 10-week hands-on research experience at a NASA Center.

Objective 1.3:

JFPF fellows are placed all over the country. The Annual Symposium offers fellows a forum in which to provide professional and career development as well as an opportunity to learn more about NASA. JFPF Fellows in Cohorts 8 to 11 came to San Jose, CA to attend the 2011 NASA Ames STEM Symposium, "Renewing the Spirit of Innovation and Discovery." At the Symposium there were able to attend numerous professional and career development workshops, including:

- NASA Ethics
- International Traffic and Arms Regulations (ITAR) – Understanding NASA's Export Control
- Media Training – How to represent yourself in the media
- NASA Shared Service Center (NSSC) – Understanding the NASA Grants Management Process: Pre- and Post- Award
- STEM Career Preparedness Panel

Objective 1.4: Organized a symposium that offered participants the opportunity to network, conduct formal research presentations, participate in professional development training, and collaborate on research ideas. Participants will include undergraduate and graduate minority students, faculty members from minority institutions, community leaders, and NASA officials. The **2011 NASA Ames STEM Symposium: *Renewing the Spirit of Innovation and Discovery*** took place July 25-29, 2011 at the DoubleTree by Hilton San Jose. The Symposium was a jointly hosted by UNCF Special Programs Corporation and the NASA Ames Research Center.

- 6 Fellows and 1 Alumni have introduced oral presentations of their work to the NASA community at the 2011 NASA Ames STEM Symposium held July 24-29, 2011 at the Double Tree by Hilton San Jose Hotel San Jose and at NASA Ames Research Center
- 51 Fellows have presented their work at the Poster Session portion of the 2011 NASA Ames STEM Symposium

Objective 2.1: N/A

Objective 2.2: N/A

IMPROVEMENTS (e.g. project management, efficiencies, etc.) MADE IN THE PAST YEAR

This year there has been changes made to the Mini-Research Award component of the JFPF. The Mini-Research Award (MRA) has transitioned to the Center Based Research Experience (CBRE), which will eventually become mandatory for all participants. Whereas in years past, there was a limited amount of opportunities for JFPF Fellows to come and work at a NASA Center, as of 2011 the new CBRE allows each Fellow to conduct 10 weeks of hands on research at a NASA Center (see list of centers below) with a NASA technical advisor. The NASA scientist serves as a mentor; working closely with the Fellow to conduct relevant NASA-related research.

Transition from Mini-Research Award

As of 2011, the Mini-Research Award (MRA) is being transitioned to the Center Based Research Experience (CBRE), which will eventually become mandatory for all participants. It is currently an optional component for Cohorts 8, 9 and 10. As opposed to the MRA, application to the CBRE is not competitive, and will become a mandatory component of the project for future awarded fellows.

Students are strongly encouraged to conduct their MRA/CBRE within the 10 week summer internship dates as specified by each center. This is typically the first week in June to the first week in August, but may differ from center to center.

Center Based Research Experience – Cohort 8-10

The CBRE allows the Fellow to conduct 10 weeks of hands on research at a NASA Center (see list of centers below). Fellows must submit research proposals in collaboration with their identified NASA mentor before participating in this research opportunity. A stipend and travel allowance is provided to the fellows to facilitate their experience at the Center with their chosen NASA Mentor for 8-10 weeks.

The NASA Mentor is expected to supervise the fellow's work during their stay at the NASA Center, or designate a person who will work with the Fellow in the mentor's absence. The mentor is responsible for signing off on a weekly timesheet to document the fellow's minimum 40 hour work week. S/he must meet all requirements set forth by the NASA Office of Education at the NASA Center. Center Based Research Experience dates are to be in alignment with the respective Center's Summer Internship dates.

The JFPF Fellow is required to submit a midterm and final report. The midterm report requires the NASA Mentor to provide a critique of the fellow's work and address any areas of concern. Mentors will also be asked to participate in an evaluation at the culmination of the Fellow's summer experience.

Center Based Research Experience – Cohort 11

Newly selected Cohort 11 members of the JPFP were required to submit research proposals in collaboration with a NASA scientist upon application to the project. Chosen Cohort 11 Fellows are expected to work with this scientist on their project throughout the academic year. The students are expected to work with their NASA mentor at the host center for 10 weeks during the Center Based Research Experience. (Please see "Cohort 11 Selection" below.)

2011 Center Based Research Experience

A total of nineteen (19) fellows participated in Center Based Research Experiences (CBRE) Summer 2011.

Fellows conducted their CBRE work at one of the following seven NASA centers:

- NASA Ames Research Center (ARC)
- NASA Glenn Research Center (GRC)
- NASA Goddard Space Flight Center (GSFC)
- NASA Jet Propulsion Laboratory (JPL)
- NASA Johnson Space Center (JSC)
- NASA Kennedy Space Center (KSC)
- NASA Marshall Space Flight Center (MSFC)

Center Based Research Experience Award Students at NASA ARC

JPFP Fellow: Kennda Lynch

Research Title: "Characterization of energy demand in microbial systems for development of habitability prediction & sample selection tools for planetary missions"

Mentor: Dr. Tori Hoehler

Tenure: May 23rd- August 1, 2011

JPFP Fellow: Thuy Hien Nguyen

Research Title: "Molecular Dynamics Studies of Small Ion Channels: Linking Structure and Conductance"

Mentor: Dr. Andrew Pophorille

Tenure: June 6-August 15, 2011

JPFP Fellow: Miraida Pagan Castillo

Research Title: "Development of a Lactate Biosensor for Monitoring the Physical Fitness of Astronauts"

Mentor: Dr. Meyya Meyyappan

Tenure: June 6 – August 15, 2011

JPFP Fellow: Rachael Roettenbacher

Research Title: "Investigating Starspot Evolution in Kepler Data"

Mentor: Michael R. Haas

Tenure: May 31-August 8, 2011

JFPF Fellow: Damaris Suazo

Research Title: "Electrochemical and Surface Characterization of Cholesterol Oxidase Immobilization on Carbon Nanofiber Electrode"

Mentor: Dr. Meyya Meyyappan

Tenure: June 6 – August 15, 2011

JFPF Fellow: Erin Summers

Research Title: "Time Delay Margin Estimation for Adaptive Control & Model-based Validation and Verification of Performance of Nonlinear and Large-scale Systems"

Mentor: Nhan Nguyen, Ph.D.

Tenure: May 31-August 8, 2011

JFPF Fellow: Jesus M. Velazquez

Research Title: "Synthesis, Characterization, and Device Integration of ZnO, In₂O₃ and SnO₂ nanowires"

Mentor: Dr. Meyya Meyyappan

Tenure: May 31-August 8, 2011

Center Based Research Experience at NASA GRC

JFPF Fellow: Dionne Hernandez Lugo

Research Title: "Carbon nanofibers composites as lithium-ion battery anodes grown on a copper substrate"

Mentor: Richard S. Baldwin

Tenure: May 31 - August 8, 2011

Center Based Research Experience at NASA GSFC

JFPF Fellow: Jonathan Gaines

Research Title: "Remote Operator Blended Intelligence System for Environmental Navigation and Discernment ((RobiSEND) Payload for Mini Rotorcraft UAV Based Search"

Mentor: Geoffrey Bland

Tenure: May 16-June 27, 2011 (6 weeks)

JFPF Fellow: Jamie Lomax

Research Title: "Massive Binaries in X-ray Light: Constraining the Geometry of Mass Loss in WR 140"

Mentor: Dr. Michael Corcoran

Tenure: June 6-August 15, 2011

JFPF Fellow: John Rigueur

Research Title: "Optimization of Multiwalled carbon Nanotube Photon Absorbers for Mid- and Far-Infrared Light Suppression in Space Instrumentation"

Mentor: Stephanie Getty
John Hagopian

Tenure: May 16 – July 25 2011

Center Based Research Experience at NASA JPL

JFPF Fellow: Erin Burke

Research Title: "Antarctic ice motion and grounding line mapping with new radar interferometry data"

Mentor: Dr. Eric Rignot

Tenure: June 6-August 1, 2011 (8 weeks)

JFPF Fellow: Athena Ganchorre

Research Title: "Constructing Knowledge in an Informal Setting: The Nature of JPL Visitors Inquiries"

Mentor: David Seidel

Tenure: June 1-August 10, 2011

JFPF Fellow: Levica Smith

Research Title: "Preparation and Characterization of Thin Transition Metal Alloy Films for Use in Polymer Electrolyte Fuel Cells"

Mentor: Dr. Charles C. Hays

Tenure: June 13-August 22, 2011

JFPF Fellow: Schetema Stevens Nealy

Research Title: "Analysis of Low CO₂ Values Observed by the Tropospheric Emission Spectrometer (TES) in the Northern Atlantic"

Mentor: Susan Kulawik

Tenure: June 1-August 10, 2011

Center Based Research Experience at NASA JSC

JFPF Fellow: Brandi Keene

Research Title: "Development of Anti-Fog Coating on Space Helmet Visors"

Mentor: Amy Ross

Mary Jane O'Rourke

Tenure: June 6-August 11, 2011

JFPF Fellow: Siobhan Tarver

Research Title: *The Use of Advanced Molecular Biology Technology to Detect and Characterize Varicella Zoster Virus*

Mentor: Duane L. Pierson
Tenure: August 29-November 4 (10 weeks)

Center Based Research Experience at NASA KSC

JFPF Fellow: Angela Munoz
Research Title: “Trapping, Monitoring, and Behavioral Analysis of Yellow Rat Snakes (*Elaphe obsoleta quadrivittata* as Predators of the Endangered Scrub Jay (*Aphelocoma coerulescens*) in the Kennedy Space Center's Merritt Island National Wildlife Refuge”
Mentor: Lynn Phillips
Tenure: June 6-August 15, 2011

Center Based Research Experience at NASA MSFC

JFPF Fellow: Jill Williamson
Research Title: “Investigation of the Water Disinfectant Silver (I) Ion by Flow Injection-Sensor-on-a-Valve and Preliminary Kinetic Studies on its Stability and Decomposition”
Mentor: Dr. Layne Carter
Tenure: June 1-August 10, 2011

JFPF Fellow: Renee Horton
Research Title: “Evaluation of Deformation Fields around Cracks in Friction Plug Welds”
Mentor: Tina Malone
Preston McGill
Tenure: June 1-August 10, 2011

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

N/A