

NASA Harriett G. Jenkins Pre-doctoral Fellowship Project (JFPF)

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EXECUTIVE SUMMARY

The Harriet G. Jenkins Pre-Doctoral Fellowship Project (JFPF) was designed to meet NASA's Education Goal 1-Outcome 1:

Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals, through a portfolio of investments.

In FY2010, JFPF contributed to the development of the STEM workforce in many significant ways. The project provided over \$1.5 million in direct financial support to forty six JFPF Fellows. Thirteen fellows participated in the optional JFPF Mini Research Award. Fifteen percent of the participants received Ph.D. degrees, and all are now employed in STEM occupations. Over ninety percent of the current participants are in Ph.D. programs representing twenty-five STEM disciplines (Figure 5). The fellows are participating in advanced degree programs at over fifteen universities, and many of these universities are located in Experimental Program to Stimulate Competitive Research (EPSCoR) States. The current fellows published twenty-five peer-reviewed articles, and many presented at national and international conferences. One hundred percent of the students were from underrepresented and underserved communities. African Americans were the largest ethnic group represented in the FY2010 demographic, followed by Hispanics of any race (Figure 4). Sixty-five percent of the participants were female (Figure 3).

This year a new solicitation significantly different than previous versions was released. Fellows will work together to complete a Cohort Project based on real world problems and all fellows, beginning with Cohort 11, will be required to do a hands-on research experience at a NASA Center.

PROJECT DESCRIPTION

NASA introduced the Harriet G. Jenkins Pre-doctoral Fellowship Project (JFPF) ten years ago to facilitate the development of a more inclusive, multicultural and sustainable workforce. The project's mission is to increase the number of underrepresented persons with master's and doctoral degrees in the NASA pipeline, and ultimately in the science, technology, engineering and mathematics (STEM) workforce. This highly competitive fellowship annually provides up to 20 awards. Once selected the new group of students are known as a cohort. The new cohort can receive funding for up to three years depending on the degree type sought. Master degree students receive funding for up to two years and Ph.D. students can receive funding for up to

three years. Students must maintain a 3.0 grade point average to remain in the project. Each year fellows are also offered the opportunity to compete for a summer mini research award, which provides additional funding to support a hands-on research experience at a NASA Center.

JFPF has employed a holistic approach to graduate student preparation by successfully addressing the need to relieve the financial burden associated with pursuing a graduate degree, mentoring, coaching, and providing meaningful work experiences at NASA Centers. This approach, coupled with professional development training, makes the JFPF one of the most unique and competitive graduate fellowship programs available.

The project continues to provide substantial financial and career development support to students, from underrepresented and underserved communities, pursuing advance degrees in STEM disciplines. For 10 years this project has helped NASA meet its strategic goal of increasing diversity in the STEM workforce; fifty-five percent of JFPF participants are now employed in the STEM workforce.

This project is administered by the United Negro College Fund Special Programs (UNCFSP) and managed by the NASA Ames Office of Education.

PROJECT GOALS

The Harriet Jenkins Pre-Doctoral Fellowship has four goals:

1. To develop U.S. science, technology, and engineering expertise in ethnic and gender groups that are considered underserved and underrepresented in the STEM workforce.
2. To offset financial barriers for students underrepresented in STEM fields pursuing a graduate education. In FY2010, Master degree students received stipend and tuition awards of \$28,000.00 and Ph.D. students received awards of \$38,000.00.
3. To provide hands-on research experiences at NASA Centers. In the reporting period, there were sufficient resources to fund thirteen mini research awards. These students received \$8000.00 for this hand-on research experience.
4. To expose students to the salient aspects of professional and career development.

PROJECT BENEFIT TO OUTCOME

JFPF was created to address Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals, through a portfolio of investments.

In particular it was designed to address Objective 1.2, Student Support:

Provide NASA competency-building education and research opportunities to individuals to develop qualified undergraduate and graduate students who are prepared for employment in STEM disciplines at NASA, industry or higher education.

JFPF addresses Outcome 1 by providing financial support and research opportunities to graduate students majoring in STEM fields. To date 191 students have received the support needed to fund their education; 118 students have participated in the mini research award component of the project, which provides hands on research experiences at a NASA Center.

In the 10 years since its inception, JFPF has achieved the Student Support Objective (1.2) by addressing the specific needs of students from underrepresented and underserved communities. All forty-six of graduate students were from underrepresented communities in FY2010. One hundred percent of the students who received Ph.D. degrees in 2010 are now employed in a STEM related industry or academia. Forty-six percent of the current JFPF participants are African American, and sixty-five percent are female. These high percentages, when compared the overall percentage of African Americans (5%) and females (31%) employed at NASA as Civil Servants in FY09, demonstrate how effectively JFPF targets and supports individuals from underrepresented and underserved communities.

JFPF provides students with the mentoring, and professional development that many often need to successfully transition from student to STEM industry employee. This past year at the 2010 Technical Assistance, Training, and Achievement Event held in Washington D.C, Fellows were provided a multi- day training course on “Best Negotiation Practices.” The training imparted important life skills, and gave the fellows techniques to use when negotiating everything from home purchases to salary increases. The Technical Assistance and Achievement Event also offered fellows the opportunity to network with NASA employees, JFPF Alumni, participants from other NASA projects administered by UNCFSP, and Harriet G. Jenkins (the project’s namesake). This systemic approach to the graduate student development prepares them for life beyond the classroom.

PROJECT ACCOMPLISHMENTS

For the period: October 1, 2009 through September 30, 2010

Project Administration Accomplishments:

- Since its inception, the JFPF has placed 191 (cohorts 1-10) outstanding scholars into NASA’s educational and workforce pipeline. To date forty-nine percent of all participants have been employed in STEM occupations, and seven percent are NASA Civil Servants.
- To date, 10 successful JFPF application review panels have formed to evaluate applicants’ potential for success in graduate school and the JFPF. These panels are comprised of representatives from academia, private industry and NASA STEM leadership. The most

recent panel provided recommendations to NASA for the establishment of Cohort 10, who began their awards in September 2010.

- Thirteen fellows were awarded mini research awards in 2010. These fellows were located at three centers (Ames, JPL and Goddard). A total of 118 JFPF fellows from Cohorts 1-9 have enjoyed hands-on research experiences at NASA installations via the Mini Research Award component
- In 2010 a new solicitation for the Harriet G. Jenkins Pre-doctoral Project was posted and UNCFSP was selected to administer the project. This new solicitation was significantly different than in prior periods, as it added many new elements to the project. Examples of the project changes found in the new solicitation were:
 - Fellows will work together to complete a Cohort Project based on real world problems.
 - The mini research award was revised so that all fellows, beginning with Cohort 11, will be required to do a hands-on research experience at a NASA Center.
- The Jenkins application process was also successfully integrated into the NASA One-Stop-Shopping Initiative (OSSSI)/Student On-Line Application for Recruiting interns, fellows, and scholars (SOLAR) systems, and the 20 members of Cohort 11 will be the first cohort selected using the new system.
- In August, UNCFSP held a Technical Assistance Training and Achievement Event, and Cohort 7 graduated from the program. This event was attended by the program's namesake, Dr. Harriet G. Jenkins. Guest Speakers included: Charles Scales, Associate Deputy Administrator; Dr. Carl Person, Manager MUREP Office of Education; Natalie Gore, Jenkins Deputy Program Manager; and Dr. Alicia Washington, Assistant Professor, Science Department, Howard University (Jenkins Alumnus, Cohort 5).
- The following six fellows provided research highlights at the 2010 Technical Assistance Training and Achievement Event:
 - Juliana Evans Abel (Cohort 7): "*Active Knits: Radical Change Enabling Hierarchical Structures*"
 - Matthew Smith (Cohort 9): "*ExoplanetStat: Detecting Transiting Exoplanets Using a Low -Cost CubeSat Platform*"
 - Brandi Keene (Cohort 9): "*The Characterization of the Degredation of Polypropylene Nanowovens Subjected to γ -sterilization*"
 - Nduka Enemchukwa (Cohort 8): "*Bioartificial Matrices to Modulate Epithelial Morphogenesis*"
 - Kayra Hopkins (Cohort 8): "*Automated Weight Computation for Skeletal Animation*"

- Serina Diniega (Cohort 7): “*Present-Day Seasonal Gully Activity on Mars*”

- UNCFSP, through its organization the Institute for Advancement (SPIA), provided a multi-day professional development training on “Best Negotiation Practices” at the Technical Assistance Training and Achievement Event.
- Seven students received doctorate degrees in FY2010:

| Name | University | Major | Gender | Ethnicity |
|-----------------|---|---|---------------|---|
| Solimar Reyes | Michigan State University | Electrical Engineering | Female | Hispanic or Latino, Black or African American |
| Ricardo Collado | Rutgers the State University of New Jersey Central Office | Other Computer and Information Sciences | Male | Hispanic or Latino, Other Race |
| Serina Diniega | University of Arizona | Applied Mathematics | Female | Hawaiian/Pacific Islander |
| Nilsson Holguin | Stony Brook University | Biomedical Engineering | Male | Hispanic or Latino, Black or African American |
| Sean Williams | Arizona State University | Computer Science | Male | Black or African American |
| Lillian Chang | Carnegie Mellon University | Artificial Intelligence and Robotics | Female | Asian |
| Briony Horgan | Cornell University | Planetary Astronomy and Science | Female | White |

- One hundred percent of the students who received degrees and were workforce eligible in 2010 are now employed in STEM occupations. Eighty-six percent of the 2010 graduates are now employed in the aerospace industry, and fourteen percent employed in academia.
- Seventeen percent of the current fellows attend Minority Institutions and one hundred percent of the current fellows are from underrepresented and/or underserved communities.
- Over ninety percent of the 2010 JFPF Fellows are in a Ph.D. program.

- Sixty-five percent of the 2010 program participants were female, as compared to the FY09 statistic indicating that only thirty one percent of NASA Civil Servants are female.

Student Accomplishments (Project Related):

- Cohort 6 Alumnus and 2009 NASA Ambassador, Quentin Bonds, accepted a Civil Servant position at NASA’s Goddard Space Center.
- Two (2) fellows were selected in 2010 to serve as NASA Student Ambassadors:
 - Serina Diniega (Cohort 7), University of Arizona
 - Kennda Lynch (Cohort 8), Colorado School of Mines

The NASA Student Ambassadors project is a Virtual Community that seeks to build an online network designed to foster greater interaction and mentorship among outstanding interns of NASA higher education projects, thereby increasing student retention through the NASA educational pipeline into the science, technology, engineering, and mathematics (STEM) workforce.

- In FY2010 JFPF Fellows authored or co-authored 25 peer-reviewed publications, and more than 20 JFPF Fellows were supported to attend and/or present at regional, national and international conferences. Examples of publications are listed below:

Cohort 7

- Serina Diniega - Geology 38, no. 11,1047-1050. doi:10.1130/G31287.1 -2010
- Serina Diniega, - Geomorphology (special edition: Planetary Dunes) 121, 55-68. doi:10.1016/j.geomorph.2009.02.010 – 2010

Cohort 8

- Lillian Chang – Journal of Motor Behavior, 1:11-27, 2010
- Briony Horgan – Journal of Geophysical Research, doi:10.1029, 2009

Cohort 9

- Hillary Davis- J. Biomed Mater Res, Part A 2009; 90A: 1021-1031, 2009
- Kimberly Hobbs - Journal of the Alabama Academy of Science, Volume 80 (No. 2) April, 2009

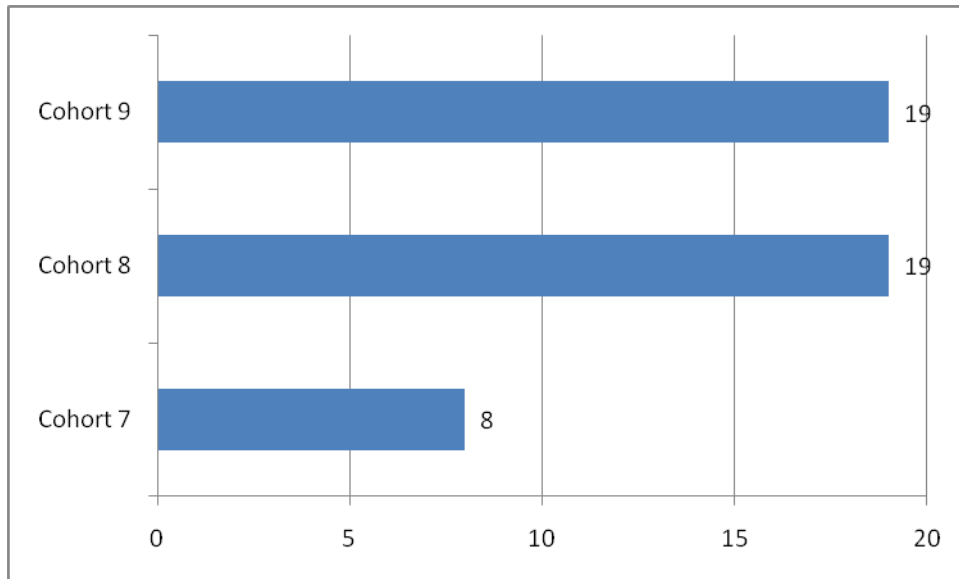
PROJECT CONTRIBUTIONS TO PART MEASURES

For the period: October 1, 2009 through September 30, 2010

The JFPF project was quite successful this year in meeting the PART measures. The information provided in the following tables and graphs support the success of this project.

Total Number of Participants FY10 (Cohort 7,8,9) : 46

Figure 1- Number of Participants per Cohort in FY2010



- Underserved/Underrepresented students participating: 46 (Ethnicity: see figure 4)
- Number of Students seeking Advanced Degrees: 46
- Number Still in School: 39
- Number of students who received Ph.D. Degrees: 7
- Number of students who received Master Degrees: 0
- Number Eligible for workforce: 7
- Number Employed at NASA:1 (Cohort 6 Alumnus)
- Number Employed in Aerospace Industry: 6
- Number Employed at Educational Institutions: 1
- Number of JFPF Fellows employed at NASA (since project inception): 13

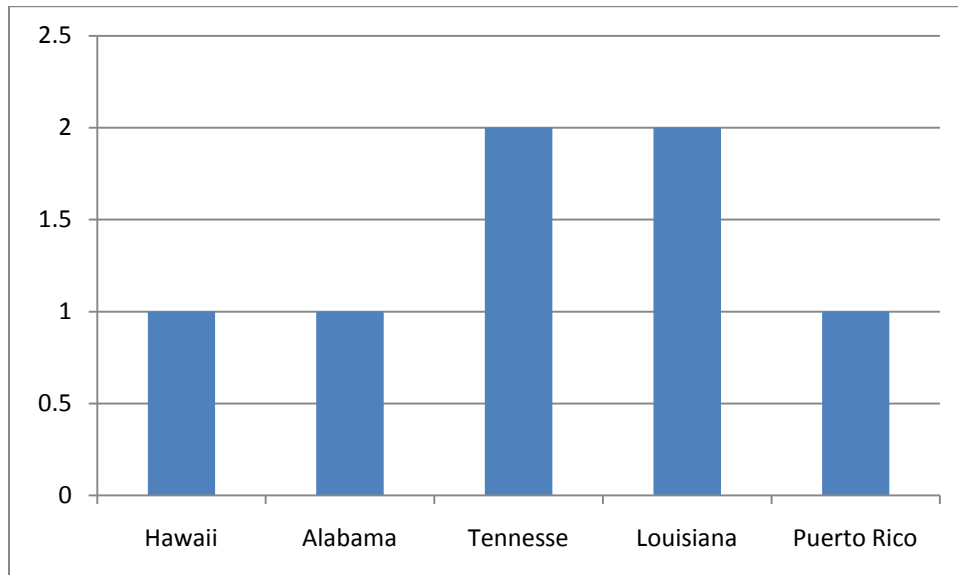
- Number of JFPF Fellows employed in STEM occupations (since project inception): 93
- Number of MSI's participating: 8
- Number of students attending school in EPSCoR states: 7

JFPF Fellows attend universities in five of the states identified as EPSCoR States.

NASA supports the mission of EPSCoR, and tries to ensure that EPSCoR states are represented within the NASA education portfolio. The mission of EPSCoR is to assist the National Science Foundation in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education." EPSCoR goals are:

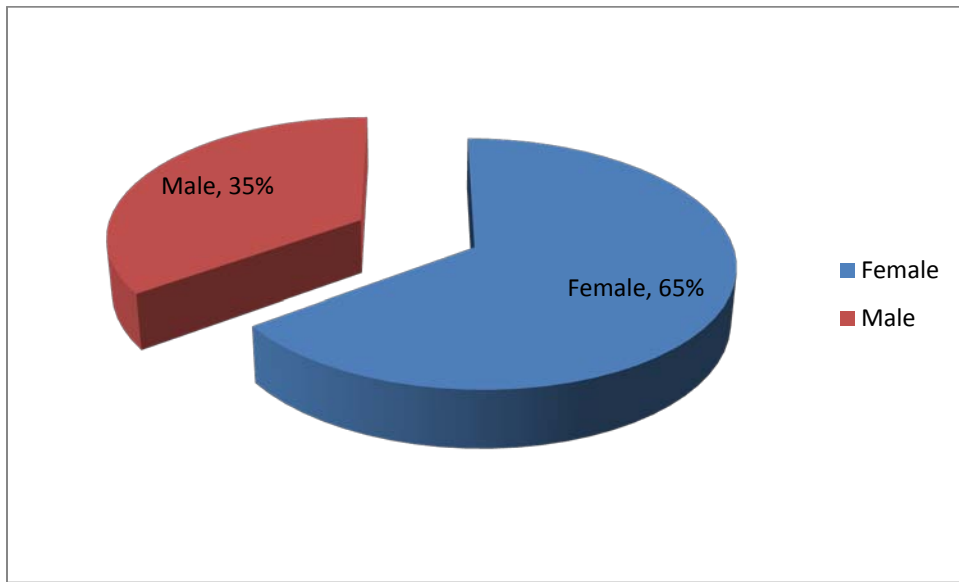
- To provide strategic programs and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness.
- To advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation and overall knowledge-based prosperity.
- To broaden participation in science and engineering by institutions, organizations and people within and among EPSCoR jurisdictions.

Figure 2 Cohort (7,8,9) EPSCoR States Represented



The JFPF project has a high female participation rate, as compared to the overall number of females employed by NASA in FY09. Only thirty-one percent of NASA’s current employees are female according to the FY09 statistics released by the organization. As Figure 3 demonstrates, the JFPF project is working to address this inequity. Sixty-five percent of the JFPF Fellows are female.

Figure 3- Male/Female Distribution



In 2010, one hundred percent of the project participants were from underrepresented and underserved communities. Figure 4 indicates that twenty percent of the participants were White/Caucasian. However, all of White/Caucasian students were from underserved communities. By far African Americans represented the largest ethnic group in FY2010, followed by Hispanics of any race.

Figure 4- Ethnicity

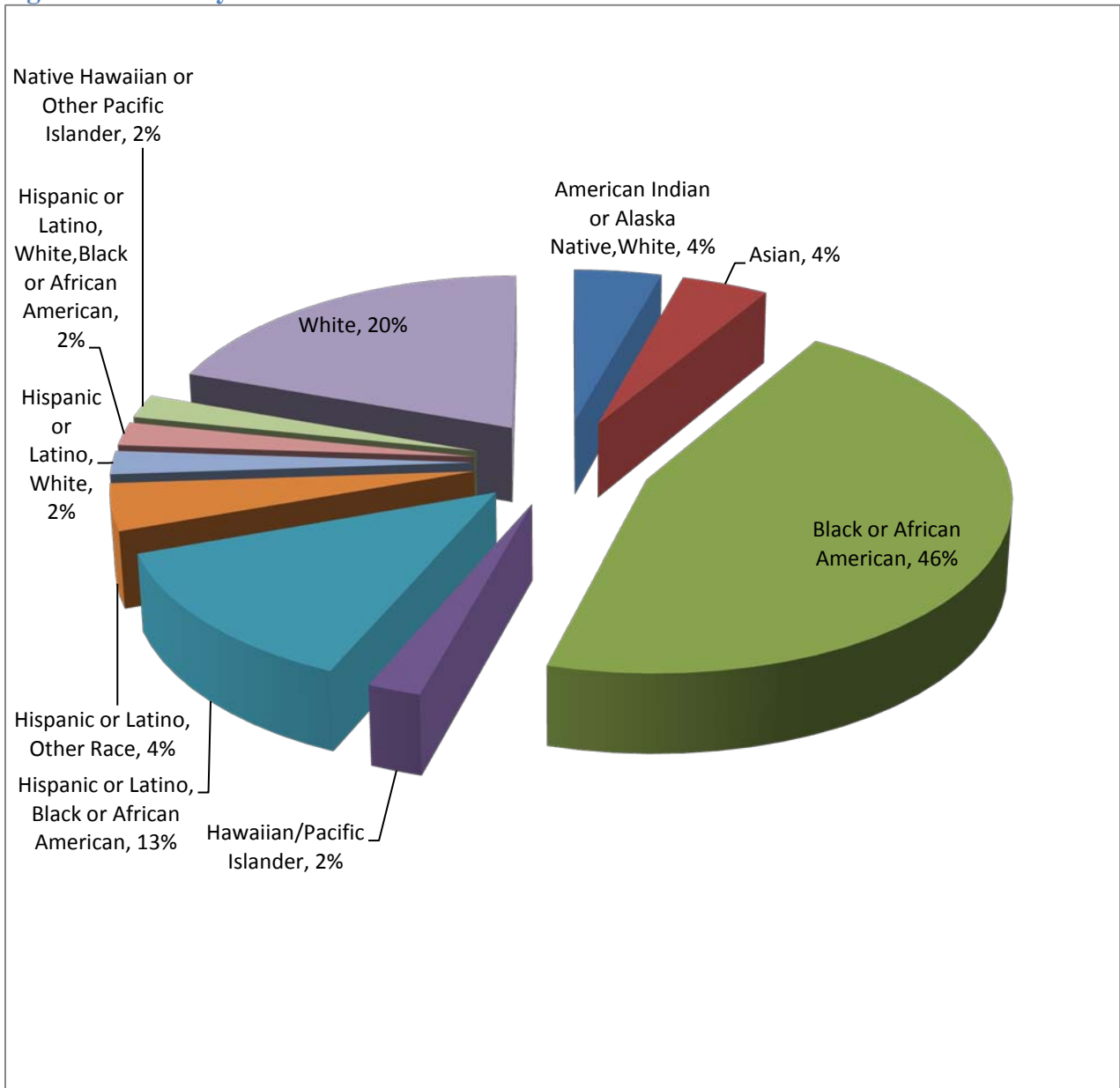
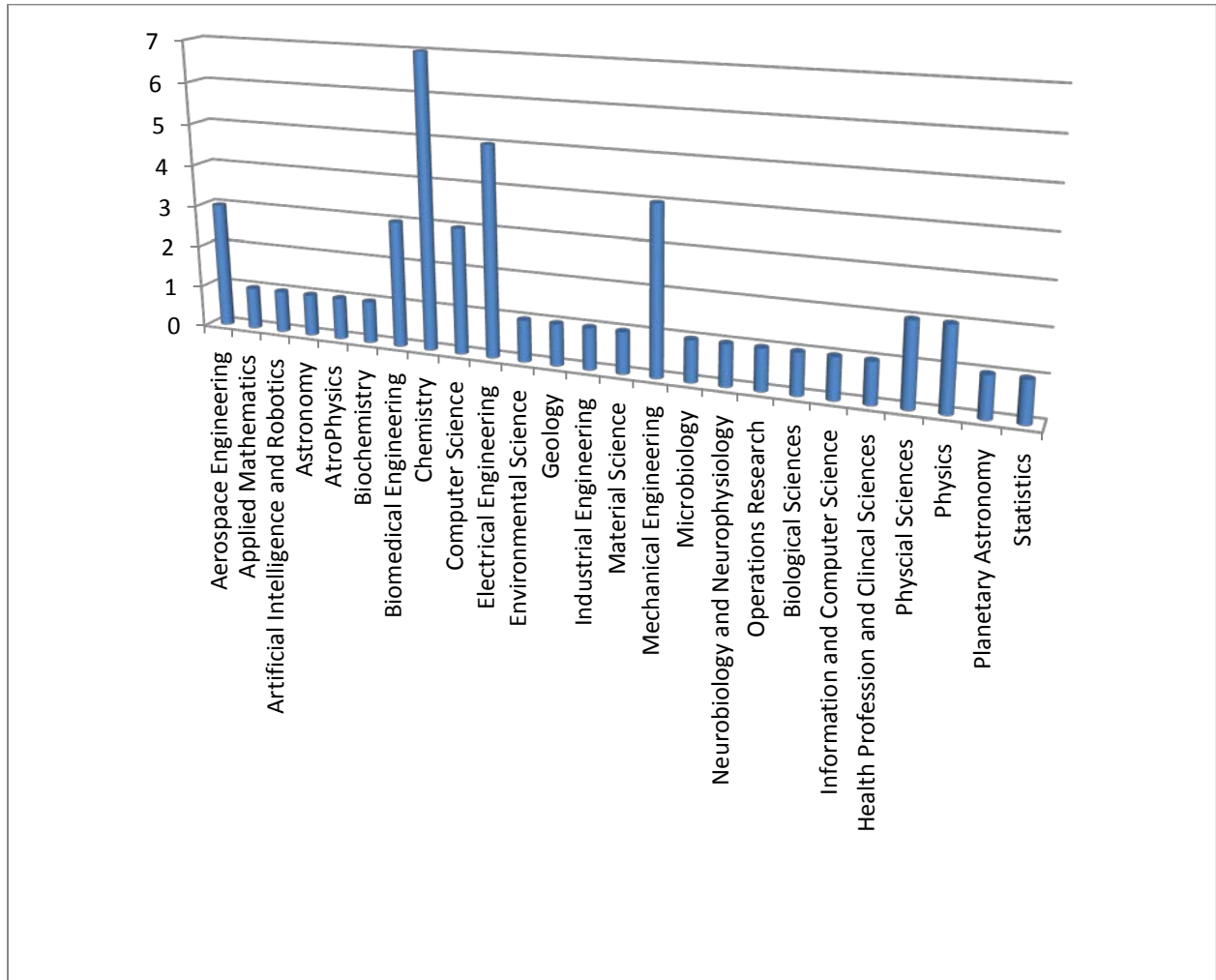


Figure 5 - Degrees Sought (number of participants seeking degree type)



PROJECT IMPROVEMENTS

The Project was modified to include a mandatory NASA Center-based research experience for all new awardees beginning FY2011. Fellows will work together to complete a Cohort Project based on real world problems. The project topic will be created by the NASA Center Co-hosting the JFPF Symposium an annual culminating event for the project. Students, who have completed their tenure in the project, graduate and the new students are introduced to the JFPF community at this event. In the future these events will rotate among the NASA centers and the hosting center will select the project topic for the new cohort. Fellows will collaborate throughout their tenure to accomplish the Cohort project which will be presented in the Cohort’s final year.

Students applying for the FY2011 cohort will apply through the new OSSI/Solar Systems and the new cohort will be selected by a panel using the OSSI/SOLAR system.

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The United Negro College Fund Special Program administers the project for NASA. It provides administrative functions for the project including paying stipends, tuition offsets, awarding the mini research award, and providing professional development training to the JFPF Fellows.

UNCFSP was founded in 2000 to serve as a portal between the visions of minority institutions and the funding priorities of our nation. Its mission is to “organize and deliver educational support services” such as capacity building, technical assistance and workforce development programs to Minority Serving Institutions (MSIs) of higher education.