

## *NASA Internships – MUREP Outcomes (9/13 – 8/14)*

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### **NASA Internships - MUREP FY 2014 Annual Report (9/1/13 – 8/31/14)**

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#### ***MUREP Purpose***

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.

This report summarizes the outcomes of MUREP funded internships in Fiscal year 2014.

#### ***NASA Internships Overview***

NASA Internships are part of the NASA Education Office's portfolio of education activities and are managed within the NASA Internships, Fellowships, and Scholarships (NIFS) Line of Business (LOB). NIFS activities are designed to leverage NASA's unique mission activities to enhance and increase the capabilities, diversity, and size of the Nation's next generation workforce needed to enable future NASA discoveries. As such, NASA Internships directly address NASA Higher Education Outcome 1 and support NASA Higher Education Outcome 2 of the NASA Education Strategic Plan. These outcomes commit the education office to fund programs which:

- contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals through a portfolio of investments
- attract and retain students in STEM disciplines through a progression of educational opportunities for students

NASA Internships most directly contribute to NASA Higher Education Outcome 1.2:

- 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, and higher education.

NASA Internships outcomes also align with the National Science and Technology Council (NSTC) Committee on STEM Education (CoSTEM) objective 4: *"Support the development of university-industry partnerships, and partnerships with Federally supported entities, to provide relevant and authentic STEM learning and research experiences for undergraduate students, particularly in their first two years"* and the President's Council of Advisors on Science and Technology (PCAST) who have called for a focus on *"increased undergraduate retention and competency in STEM."*

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NASA Internships achieve these goals by exposing students and STEM teachers from a wide array of academic institutions, which reflect the full diversity of the nation to NASA ongoing mission activities. Students selected for this program will undertake mentor-guided internships at NASA field centers under the tutelage of NASA scientists and engineers, or will be imbedded with research teams working on NASA related STEM activities at aerospace contractors, government research laboratories, or academic institutions.

The following sections outline the outcomes of MUREP funded internships at NASA centers in FY14.

### Outcomes Data

NIFS activities are designed to generate the following outcomes goals:

1. Provide significant merit-based direct awards to qualified students with emphasis on: (1) racially or, ethnically underrepresented students (in STEM), (2) females, (3) persons with disabilities and (4) veterans at percentages that meet or exceed the national graduation percentages for these populations by academic disciplines, as determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics.
2. Seek to improve retention rates of students in NASA-relevant disciplines by (a) increasing persistence in degree pursuit through scholarship & academic mentoring support (b) increasing competencies through degree-relevant experience in applying classroom knowledge and skills, and (c) increasing motivation through building professional self-confidence and clarifying career opportunities.
3. Generate useful, degree-relevant productivity to advance NASA's mission and directly benefit mentors projects.
4. Leverage participant experiences and enthusiasm to raise public awareness of NASA activities, inform educators and students of ways they can connect with NASA, and inspire younger students to consider science and mathematics pursuits.

NASA Internships support all of these goals with the exception of 2(a). In this section you will find data demonstrating alignment with these goals and, by extension, the overall NASA Office of Education API's. Since NASA Internships can range from short summer experiences to year-long opportunities, the volume of MUREP-funded internship activity will be presented in terms of individual participants as well as total internship weeks.

### Participation Metrics

This section provides demographic data on MUREP-funded interns demonstrating project performance in alignment with outcome 1 of the NIFS Implementation roadmap. The tables below illustrate the total volume of NASA MUREP-funded internships activity which occurred in each internship session as well as the overall totals for this reporting period. Data presented includes summer internships typically lasting 10 weeks and semester internships typically lasting 16 weeks. Data is presented both by number of weeks and individual intern to differentiate the relative depth of experience between those two internship sessions.

For this reporting period there were 28 semester and 66 summer internships funded by MUREP. Also, all NASA internship activity for this reporting period occurred at a NASA center. Table 1 shows the internship activity by NASA center.

**Table 1: MUREP-funded Internship Activity by Center**

|                   | MUREP-funded interns | Weeks | % (Weeks) |
|-------------------|----------------------|-------|-----------|
| <b>FY14 Total</b> | 94                   | 1113  |           |
| <b>Ames</b>       | 15                   | 168   | 15%       |
| <b>Armstrong</b>  | 6                    | 68    | 6%        |
| <b>Glenn</b>      | 5                    | 68    | 6%        |

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|                 |    |     |     |
|-----------------|----|-----|-----|
| <b>Goddard</b>  | 11 | 122 | 11% |
| <b>JPL</b>      | 12 | 138 | 12% |
| <b>JSC</b>      | 10 | 118 | 11% |
| <b>KSC</b>      | 10 | 118 | 11% |
| <b>Langley</b>  | 10 | 127 | 11% |
| <b>Marshall</b> | 11 | 134 | 12% |
| <b>Stennis</b>  | 4  | 52  | 5%  |

### Participant Demographics

The following tables show the number and percentages of participants during the current reporting period for populations typically underrepresented in STEM fields. Race data for the time period covered by this report erroneously included *Hispanic or Latino* as a possible answer, this issue was corrected for future reporting periods.

**Table 2: Self-Identified Race**

|                    | Interns | Weeks | % (Wks) |
|--------------------|---------|-------|---------|
| <b>FY14 Total</b>  | 94      | 1113  |         |
| <b>Am. Indian</b>  |         |       |         |
| <b>Alaska Nat.</b> | 4       | 40    | 4%      |
| <b>Asian</b>       | 5       | 62    | 6%      |
| <b>Black</b>       | 23      | 260   | 23%     |
| <b>Declined</b>    | 12      | 155   | 14%     |
| <b>Hispanic</b>    | 21      | 264   | 24%     |
| <b>Multiple</b>    | 2       | 20    | 2%      |
| <b>White</b>       | 27      | 312   | 28%     |

**Table 3: Self-Identified Ethnicity/Sex**

|                     | Interns | Weeks | % (Wks) |
|---------------------|---------|-------|---------|
| <b>FY14 Total</b>   | 94      | 1113  |         |
| <b>Non-Hispanic</b> | 50      | 548   | 49%     |
| <b>Hispanic</b>     | 34      | 447   | 40%     |
| <b>Decline</b>      | 10      | 118   | 11%     |
| <b>Male</b>         | 62      | 768   | 69%     |
| <b>Female</b>       | 32      | 350   | 31%     |

### Participation by Institution Type

The following table shows the number and percentages of participants representing Minority Serving Institutions during the current reporting period.

**Table 4: Representation of Minority Serving Institutions**

|                   | Interns | Weeks | % (Wks) |
|-------------------|---------|-------|---------|
| <b>FY14 Total</b> | 94      | 1113  |         |
| <b>MSI's</b>      | 86      | 1033  | 93%     |
| <b>PWI</b>        | 8       | 80    | 7%      |

### Geographic and Institutional Diversity

The following institutions were represented by MUREP-funded interns during the current reporting period:

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Alabama A & M University, American River College, Bakersfield College, Bethune-Cookman University, California State Polytechnic University-Pomona, California State University-Channel Islands, California State University-Fullerton, California State University-Long Beach, California State University-Northridge, California State University-San Bernardino, California State University-San Marcos, Chaffey College, Chief Dull Knife College, Citrus College, Claflin University, College Of San Mateo, College Of The Sequoias, CUNY City College, Dine College, Florida International University, Gadsden State Community College, Howard University, Inter American University Of Puerto Rico-Bayamon, Jackson State University, Leeward Community College, Los Angeles Pierce College, Morgan State University, Navajo Technical College, Norfolk State University, North Carolina A & T State University, Northern New Mexico College, Oakwood University, Pacific University, Pasadena City College, Pima Community College, Prairie View A & M University, Rensselaer Polytechnic Institute, Rosamond High School, Saint Louis University-Main Campus, Salish Kootenai College, San Jacinto Community College, San Joaquin Delta College, South Carolina State University, Southwestern Indian Polytechnic Institute, Texas A & M University, The University Of Texas At Arlington, The University Of Texas At Brownsville, The University Of Texas At El Paso, Tuskegee University, Universidad Del Turabo, Universidad Politecnica De Puerto Rico, University Of California-Irvine, University Of California-Riverside, University Of Central Florida, University Of Illinois At Chicago, University Of Maryland-College Park, University Of Puerto Rico-Bayamon, University Of Puerto Rico-Mayaguez, University Of South Carolina-Columbia, University Of Southern California, University Of The District Of Columbia, University Of Wisconsin-Platteville, Virginia Polytechnic Institute And State University, Virginia State University, Wesleyan University.

**Table 5: Geographic Distribution of Participants Based on Home Address**

| Home State | Intems | Home State | Intems | Home State  | Intems |
|------------|--------|------------|--------|-------------|--------|
| AK         | 1      | MD         | 2      | NY          | 4      |
| AL         | 2      | MI         | 1      | OR          | 1      |
| AZ         | 2      | MS         | 3      | PA          | 1      |
| CA         | 26     | MT         | 2      | SC          | 3      |
| DC         | 3      | NC         | 3      | TN          | 1      |
| FL         | 4      | NJ         | 1      | TX          | 12     |
| IL         | 2      | NM         | 3      | VA          | 2      |
| MA         | 1      | NV         | 1      | Puerto Rico | 13     |

### Academic Disciplines Represented

The following charts and tables show the academic majors of participants during this reporting period. In all, more than three-quarters (77%) of the MUREP-funded interns identified with one of the top seven majors listed in Table 6. General Engineering majors typically came from institutions with only a pre-engineering or general engineering program available. Additional engineering majors included: Biological, Biomedical, Chemical, Civil, Environmental and Nuclear Engineering. Additional science majors included: Biology, Chemistry & Environmental Science. Additional technology and mathematical majors included: Applied Mathematics, Electronics, and Information Technology.

**Table 6: Top Intern Majors**

| Major           | %   |
|-----------------|-----|
| Mechanical Eng. | 24% |

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|                 |     |
|-----------------|-----|
| Electrical Eng. | 12% |
| Aerospace Eng.  | 9%  |
| Comp Science    | 9%  |
| Computer Eng.   | 8%  |
| General Eng.    | 8%  |
| Physics         | 7%  |

### ***Project Benefit to Office of Education Outcomes 1 & 2***

NASA internships are fully-immersive experiences for STEM students providing experiences spring, summer, and fall. Research shows that one of the best methods of maximizing retention within a field of study is to incorporate experiential opportunities into the traditional course of study. Benefits in terms of retention to graduation, increased capability at graduation, pursuit of advanced degrees, and retention within the career field are well documented. However, NASA Internships operated under a new set of administrative processes in the time period covered by this report. Evaluation instruments and longitudinal data collection processes were not yet approved and in place for this reporting period. However, the references listed below describe the learning and retention outcomes for a previous NASA internship program which are expected to be representative of those generated by the MUREP-funded internships documented in this report.

### ***Improvements Made In the Past Year***

The time period covered in this report reflects the initial operating year for a consolidated set of business processes intended to facilitate all NASA internships. Further improvements in the software systems supporting application, selection, implementation, and evaluation are planned over the next two fiscal years. In addition new evaluation instruments and processes for documenting learning outcomes are planned for implementation as early as FY16.

### ***Project Partners and Role of Partners In Project Execution***

Universities Space Research Association (USRA) provides coordination and administration in support of NASA Internships through a cooperative agreement with NASA Johnson Space Center (JSC). JSC provides operational leadership of NASA Internships for the agency under the direction of the NASA Internships, Fellowships, and Scholarships (NIFS) Line of Business Director at NASA Headquarters Office of Education.

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