



## WORKFORCE AND DIVERSITY PROGRESS REPORT

Calendar Year 2016

Dear Colleague,

This letter summarizes, for AURA employees and governance, the actions we have taken in 2016 to broaden participation in AURA activities and to work towards the development of a diverse future workforce. We also attached recent brief reports from AURA Centers to give a flavor of current Diversity initiatives.

This report marks eight years since AURA undertook a focused commitment to achieve and strengthen the following.

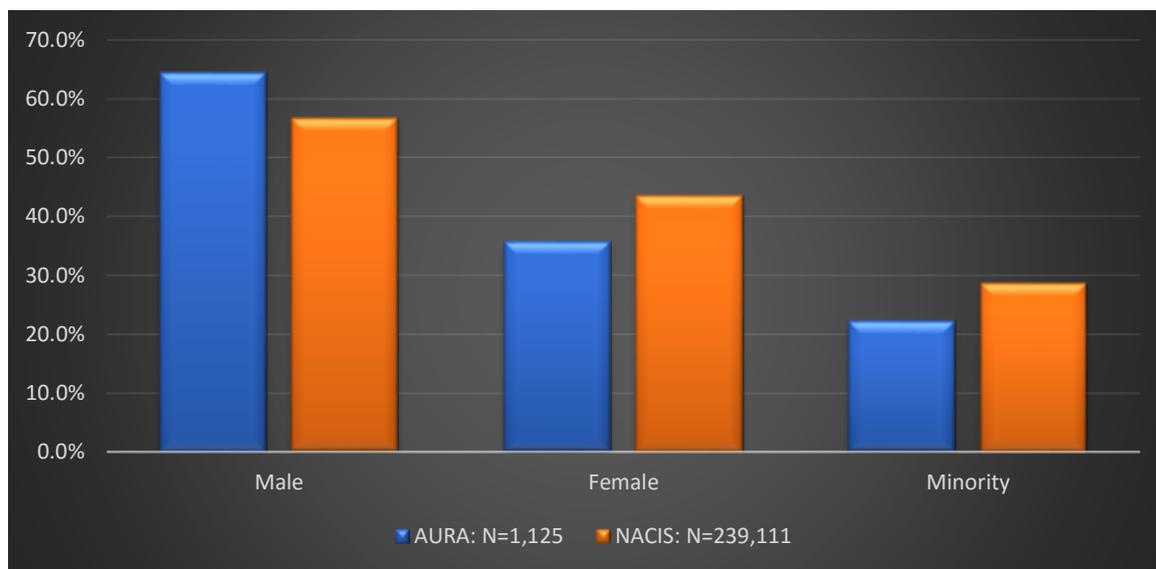
- *A Diverse Cross-section of Individuals Employed as AURA Staff:* we will strive to achieve a diverse and inclusive collection of individuals and groups who bring varied human characteristics such as origins, backgrounds, interests, skill characteristics, and perspectives to enrich the workforce.
- *A Future Workforce:* we will orient our outreach programs and partnerships to create opportunities for under-represented minorities, women, and persons with disabilities for the purpose of increasing the flow of undergraduates, graduates, and post-docs into the fields of astronomy and related technologies.
- *A More Diverse Institutional Participation:* we will reach out to institutions that have not had a history of involvement in AURA's activities, especially smaller institutions and institutions with high percentages of under-represented groups.
- *A More Diverse Geographic Participation:* we will identify and establish a greater presence in geographic areas that have not had the opportunity to contribute to AURA's mission and the overall field of astronomy.

In 2008, AURA established a permanent Workforce and Diversity Committee. This committee is comprised of both external members and internal AURA staff: AURA specifically identifies individuals within its Centers as "Diversity Advocates" and also includes the Human Resources leads on both the NASA- and NSF-funded sides of AURA's activities. The WDC meets twice per year, alternating among the AURA Center locations. It reviews and examines issues of diversity and inclusion relating to the workforce of AURA.

## AURA Staff Demographics

### AURA Employees

AURA compares its demographic makeup to the set of organizations that are required by the Equal Employment Opportunity Commission to report under the classification NAIC 54171, Private Sector Physical, Engineering, and Life Sciences<sup>1</sup>. There are over 300,000 workers in this category, of whom AURA employs about a thousand.



**Figure 1: Overall AURA demographics in 2016 compared with national level**

As seen in Figure 1, in 2016 women and minorities in AURA lag slightly compared with the national percentages for organizations in our category.

Figure 2, similarly, illustrates a positive trend over the past six years in the percentage of AURA employees who are categorized as under-represented groups. As seen, the subset that has traditionally been considered under-represented in STEM fields (Hispanic, African American, Pacific Islander, and American Indian) has shown growth. Also, the percent of employees who identify two or more ethnicities has also grown. Overall the percentage of employees classified as minority has grown from 17% in 2009 to 22% in 2016.

Figure 3 breaks out ethnicity, separating out the Asian-American population as it is not under-represented in the STEM field. The Under Represented Minority (URM) category in Fig. 3 therefore excludes the Asian-American population within this analysis.

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<sup>1</sup> See <http://www1.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2015/index.cfm> EEOC data generally track NSF Science and Engineering Indicators where data can be compared.

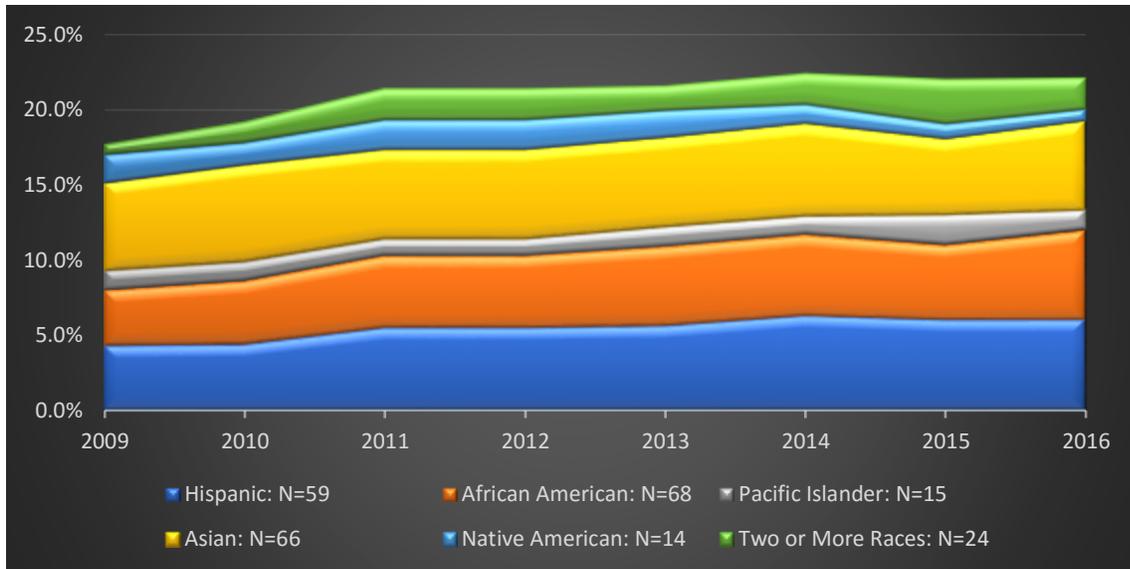
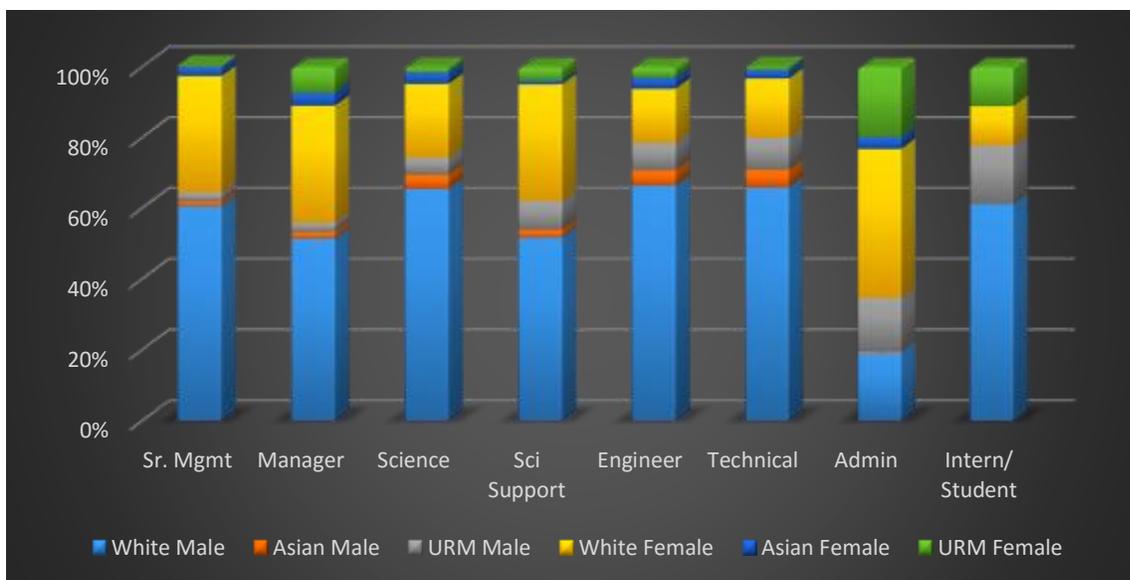


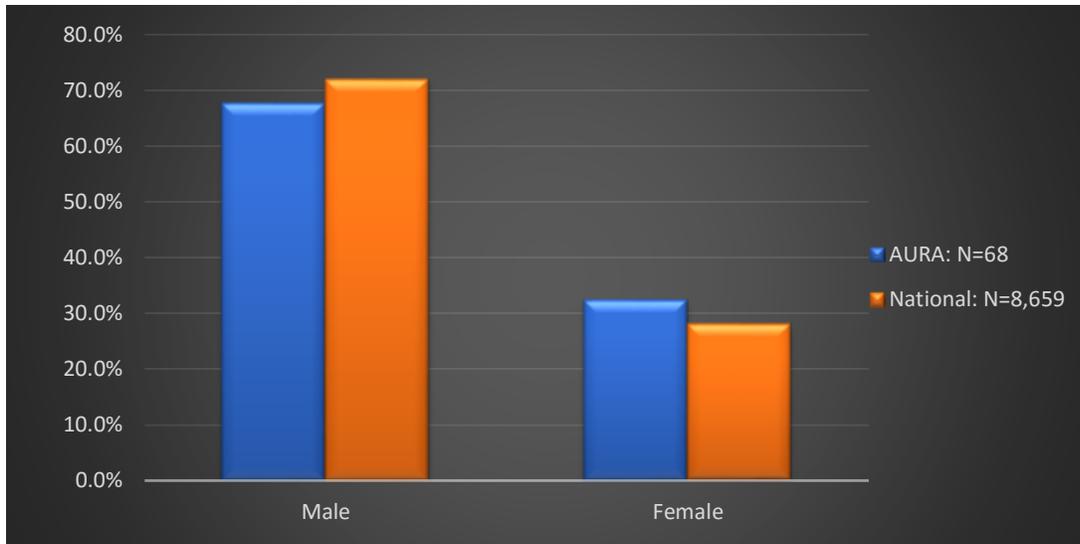
Figure 2: AURA-wide percentage of underrepresented groups.



	Sr. Mgmt	Manager	Science	Sci Support	Engineer	Technical	Admin	Intern/Student	Totals
White Male	46	56	163	94	213	79	52	11	714
Asian Male	1	2	10	4	14	6	1	0	38
URM Male	2	3	12	15	25	11	41	3	112
White Female	25	36	52	60	49	20	114	2	358
Asian Female	2	4	8	2	10	3	9	0	38
URM Female	0	8	4	7	10	1	54	2	86
Totals	76	109	249	182	321	120	271	18	1346

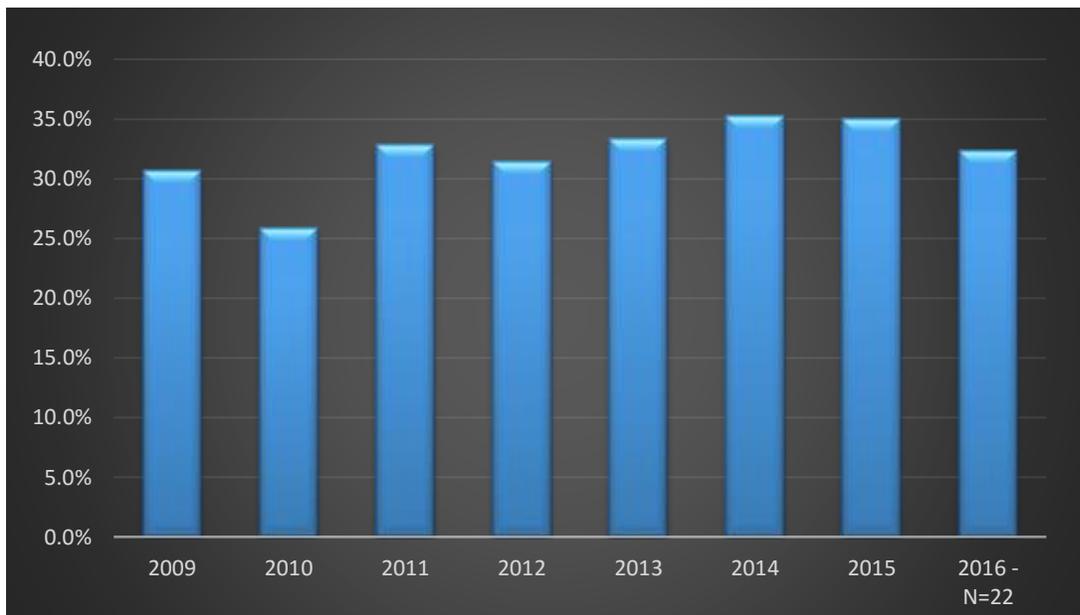
Figure 3: Total AURA Staff. Note ALL Senior Managers and Managers are also counted in other groups.

Over the past five years, AURA has focused on recruiting and retention of women and minorities in its top management ranks. Figure 4 shows the 2016 gender demographics for the highest employment classification, *Executive and Senior Management*. AURA outperforms the national average for percentage of women. Since 2009 the percentage of women in AURA senior management has grown from 26% to 32%.



**Figure 4: Gender distribution for executive and senior management in 2016.**

Figure 5 further shows that the percentage of women in this category of Executive/Senior Management has increased since 2009.

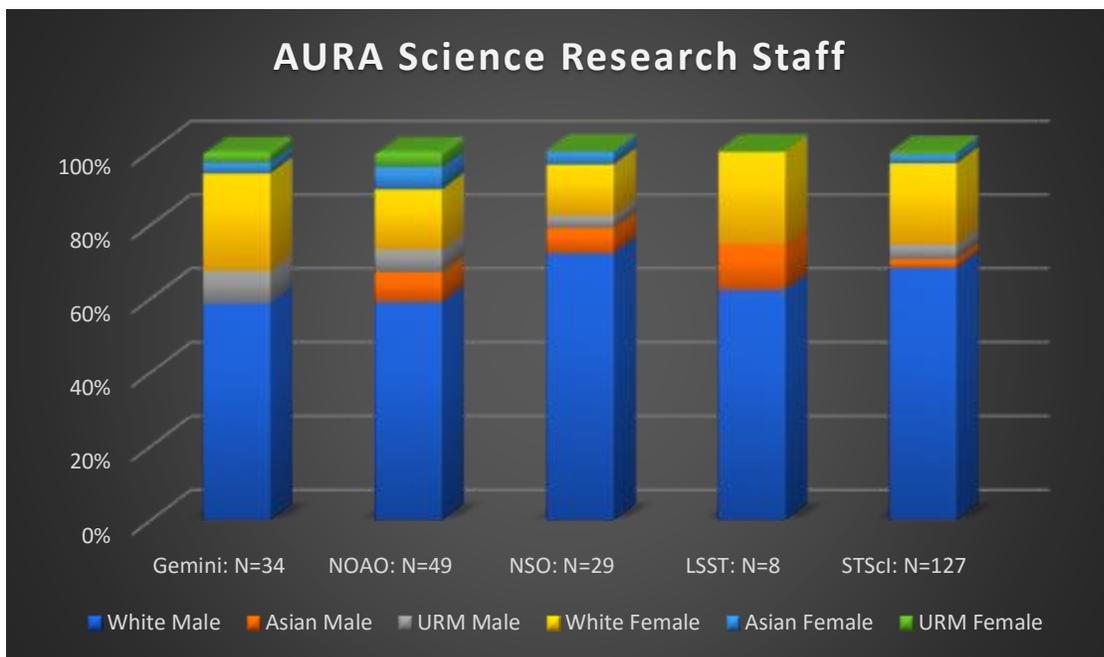


**Figure 5: Trend in Women Executive/Senior Managers in AURA Centers.**

To maintain this positive trend, AURA puts special attention on its search and recruitment processes. It is increasingly recognized that the diversity of search committees is not always sufficient to achieve a more diverse workforce due to unconscious bias held by both men and women. Consequently, AURA includes within its processes a Recruitment Guide for search committees<sup>2</sup> and has instituted a policy of introducing search committees to current findings on unconscious bias. Training on unconscious bias has been a priority throughout the AURA organization, not only for search committees but for all areas where selections occur.

AURA also has focused effort into ensuring the diversity of applicant pools, and short lists are evaluated with respect to the total applicant pool as a check for potential bias.

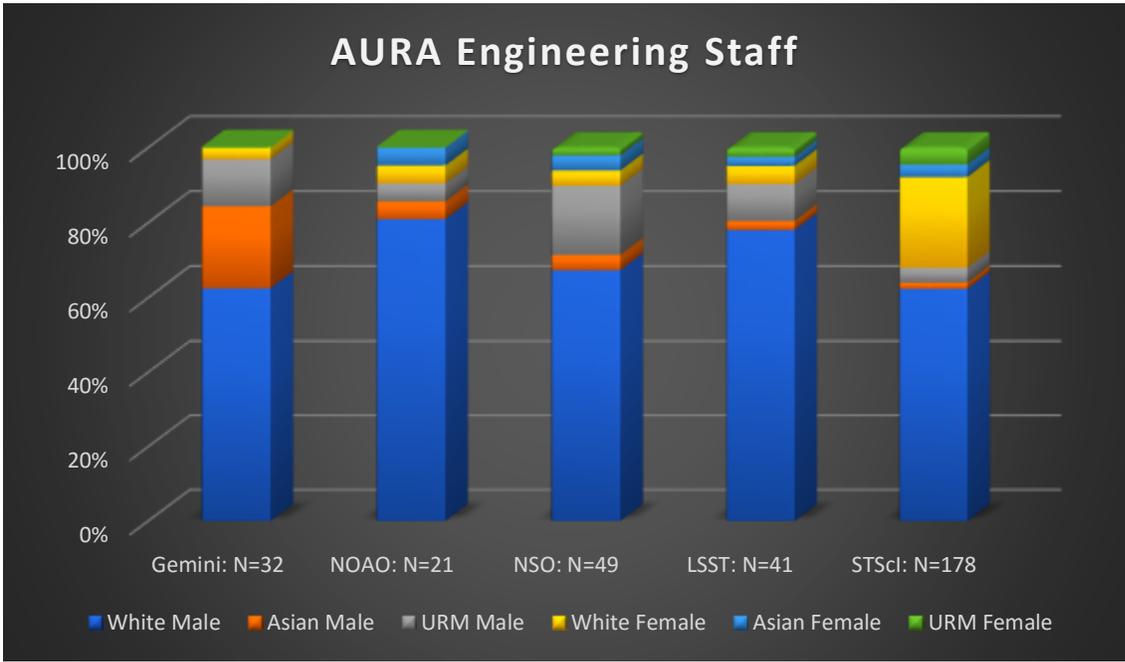
Science and engineering staff represent a special category of employee relevant to NSF and NASA diversity goals. Figure 6 shows the gender/ethnicity breakdown for science research staff for AURA Centers.



**Figure 6: Science Research Staff Demographics for 2016.**

Engineering staff tend to reflect local pools to a greater extent than science staff. However, other factors such as engineering sub-discipline (e.g., software engineers, mechanical engineers) also affect the demographics. Figure 7 shows the breakdown for AURA engineering staff. During 2016, AURA further developed its relationship with the Society of Women Engineers (SWE) through by having booth at the SWE annual conference and by sponsoring over 20 female engineers to attend, support professional development, develop recruiting contacts, and publicize engineering opportunities at AURA Centers.

<sup>2</sup> <http://www.aura-astronomy.org/diversity/documents/AURA Recruitment Guide - Final.pdf>



**Figure 7: Engineering Staff Demographics for 2016.**

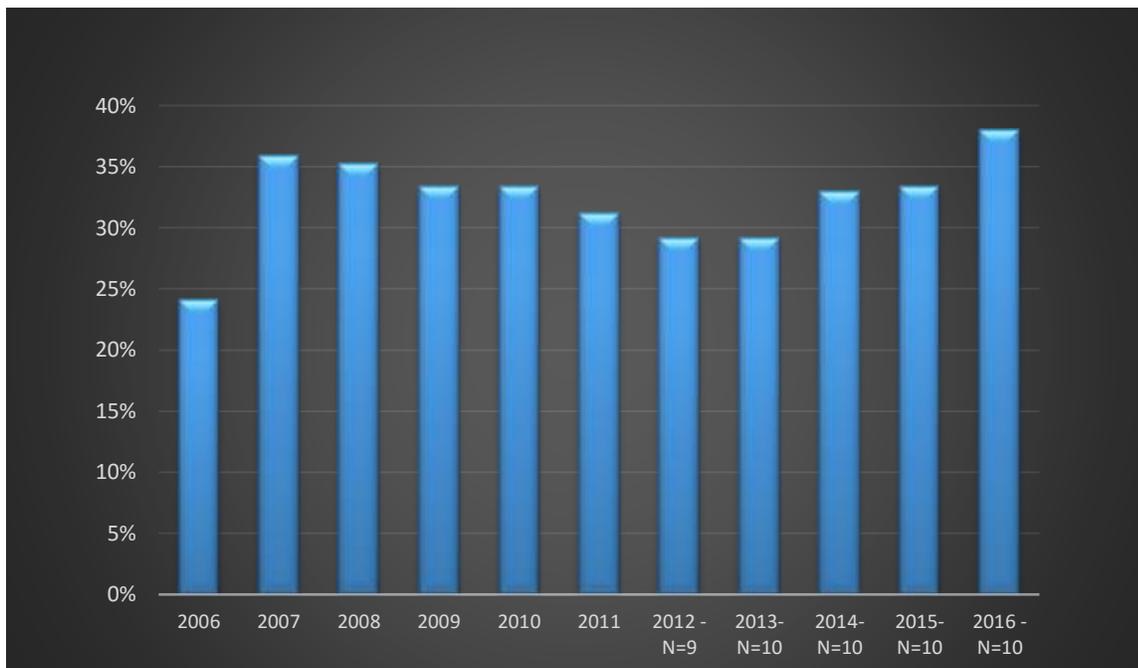
**Staff Hiring**

Although overall demographics are difficult to change over the short term, key tools for success in diversification of AURA centers are recruitment, hiring, retention, and promotions. Turnover in AURA organizations is very low, however. As these opportunities arise, AURA strives to hire and promote women and under-represented groups in order to improve diversity in the overall composition of its workforce.

- For STScI in 2016, there were 149 new hires, of whom 59 were women and 25 were under-represented minorities. Of 91 promotions, 48 were women and 20 were under-represented groups (included overlapping categories).
- For LSST in 2016, the workforce increased to 86. Of the 22 new hires (transfers within AURA and external), 6 were women and included 2 under-represented groups. There was one promotion.
- For NSO in 2016, there were 18 new hires (transfers within AURA and external), of whom 9 were females and 5 were from under-represented groups. There were 8 promotions, two of whom were female/under-represented group.
- For NOAO in 2016, there were 30 new hires (transfers within AURA and external), of whom 14 were female and 4 were under-represented groups. There were also 17 promotions, of whom 4 were female and 8 were underrepresented groups (included overlapping categories).
- For Gemini in 2016, there were 19 new hires, of which 9 were female and 4 were from under-represented groups. There were also 16 promotions, of which 4 were female and 1 was from an under-represented group.

## AURA Governance Demographics

AURA has also sought to increase diversity within its governance: its Board of Directors, its Management Councils, and its committees (<http://www.aura-astronomy.org/>). In 2008, AURA set an informal goal to maintain at least 30% women and minorities in its governance. This goal was intended to lead the astronomy community in general, where such participation rates historically lag in governance participation. As seen in Figure 9, over the past several years, this fraction has fluctuated. AURA governance choices are often highly constrained by a variety of factors (e.g., the need to include representatives from certain institutions, the need to include specific international representatives, the need to gain specific scientific and management expertise, etc.). The AURA goal has been met through the elected members for 2014 – 2016.



**Figure 8: Women in AURA Governance.**

### **AURA Workforce Development Activities**

#### ***Society of Women Engineers (SWE)***

AURA sponsored a booth during 2016 at SWE National conference, as part of an ongoing commitment to developing a pipeline of female engineers. Over 20 female engineers attended the event promoting AURA and attending professional development events (Figure 10).



**Figure 10. AURA SWE booth and team.**

### ***Akamai***

AURA Centers have also reached out in to other specific workforce development initiatives. In the past, NSO sponsored a special Akamai Technical Workshop in Maui, to stimulate interest in engineering careers among alumni of the Akamai Internship Program. NSO will support for 1-2 Akamai interns for each of the next two years... The long-range goal for the NSO in the Akamai program is to build the local STEM workforce on Maui in order to achieve a stable reservoir of technical talent available to support the Daniel K. Inouye Solar Telescope (DKIST) operations and on-site instrument development activities. NSO and Gemini scientists and engineers mentor Akamai interns, and participate in Akamai's mentor training program. The Akamai program is led by the Institute for Scientist & Engineer Educators at University of California, Santa Cruz.

### ***PAARE***

All AURA Centers have benefitted from the NSF's Partnerships in Astronomy and Astrophysics Research and Education Program (PAARE). Although not directly eligible to submit proposals, AURA Centers have acted as partners in the overall bridge program by providing valuable research experience. Since 2009, AURA Centers have hosted 11 PAARE students, 8 from the Fisk-Vanderbilt program alone. Three of these students have subsequently gained employment in AURA centers. This demonstrates what is possible through strategic engagement with specific programs, and the valuable connections that can be made between student programs and workforce development.

### ***NSO in Boulder and collaborations with the University of Colorado (CU)***

The NSO relocation of its headquarters to Boulder and its partnership with the University of Colorado is a unique opportunity and key toward enhancing diversity at the NSO and the solar

physics workforce. NSO embraces the ways in which CU proposes to work with us to promote diversity in future generations of solar astronomers which include the following.

- Participation in CU SMART (included in the Colorado Diversity Initiative) program (<http://www.colorado.edu/GraduateSchool/DiversityInitiative/undergrads/smart/details.html>) that offers about 25 students per year a ten-week opportunity to conduct research under the guidance of a faculty mentor. Conversations are on-going to have NSO staff members as mentors in this program.
- Integration of NSO's REU program into the program led by LASP and that includes the REU programs of all of the institutions within the Boulder Solar Alliance (BSA). The gender statistics of the LASP REU program show that about 53% of the participants are female (similar to NSO's REU program) and 16% from under-represented groups (NSO's REU program is 8%). The existing LASP REU program ending 2015; they have submitted a new proposal to continue the training of undergraduates. NSO has started conversations with the LASP REU coordinator to see how we can establish a collaborative framework for NSO's summer activities together with the BSA.
- The Hale COLLABorative Graduate Education (COLLAGE) Program represents a clear venue to achieve diversity goals as NSO will have access to students not only from CU, but from four other universities spread throughout the country (UH/IfA, NMSU, MSU, and NJIT). The NSO sees the COLLAGE as a great opportunity to access a diverse audience that includes Hawai'i. The three credits of the 2016 COLLAGE course, 'Topics in Solar Observation Techniques', are distributed among the following two topics:
  - Off-limb Coronagraphy and Spectroscopy. Instructor: S. R. Cranmer (LASP).
  - Applied Spectropolarimetry: Radiative Transfer and Diagnostics Techniques. Instructors: H. Uitenbroek (NSO) and R. Centeno Elliot (HAO).

### ***Large Synoptic Survey Telescope (LSST)***

LSST project funds cannot be used to support outreach or education programs during construction. However, in 2016 the LSST Corporation provided funding through its Enabling Science initiative for the LSSTC Data Science Fellowship Program (LDSFP). This two-year training program is designed to teach astronomy students essential skills for dealing with big data from LSST that are not easily addressed by current graduate-level astrophysics programs. The LDSFP consists of three one-week schools per year, over a two-year period. There are sixteen talented students in the 2016 LDSFP cohort, run by Dr. Lucianne Walkowicz at the Adler Planetarium.

S. Jacoby attended the second annual US-Chile Education Summit in Chile March 7-11, 2016, making contributions to the "Professional Observatories" chapter of the roadmap document under development by this group. Organized by [Associated Universities Inc.](#) (AUI), [Associated Universities for Research in Astronomy](#) (AURA), [Carnegie Institution for Science](#), the [United States Embassy in Chile](#), and [CONICYT](#), the summit took place in La Serena, Chile and brought together 35 astronomy education and outreach experts from Chile and the United States to explore mutually beneficial educational and astrotourism projects.

### ***STScI Engineering***

In 2016, Human Resources staff and faculty at Capital College defined a career pipeline for upcoming engineering graduates. This is resulting in an ongoing placement of interns and hires at STScI, particularly in Flight Operations and Test Engineering. In 2016, 1 individual was placed with STScI, one female from an under-represented group.

## **Institutional Initiatives**

This section addresses a number of other initiatives taken by AURA and its Centers that relate to workforce issues.

### **Promotion of AURA at national conferences and meetings for underrepresented groups**

AURA has developed a key priority developing a presence these meetings in order to promote the AURA brand as a leader in astronomy and to use these meetings to establish recruiting contacts in order to develop the talent pipeline.

During 2016, AURA had a recruiting presence at key national conferences of the National Society of Black Engineers and Society of Women Engineers.

### **Systematic Bias Effects in Telescope Time Allocation**

AURA has been a leader in analyzing and published information showing what appears to be systematic bias effects in telescope time awards. Published analyses over the past few years have indicated the presence of a systematic difference in the success rate of Hubble Space Telescope proposals with female Principal Investigators (“PIs”) with respect to those with male Principal Investigators. Similar trends have been found within NOAO time allocation committees. During 2016, non-AURA organizations reported finding similar trends in their own processes (e.g., NRAO, ESO).

Changes to the proposal process, such as removing the name of the PI have been introduced, but to date, impacts of these efforts have been inconclusive. AURA continues to examine these issues, educate the committees about unconscious bias, and explore additional possible mitigations.

### **The Role of Unconscious Bias in other areas at AURA**

AURA continues to monitor developments in the area of unconscious bias, and to educate its management, workforce, and governance. The application of criteria-based decision making has further been adopted based upon the research that this reduces the impact of bias.

During 2016, the AURA member representatives and the AURA Nominating Committee were given presentations on the role of unconscious bias, and elections were conducted based on defined criteria rather than anecdote.

AURA developed further training and communications for staff involved in recruitment and management decision-making. Briefings on the role of unconscious bias to hiring committees are a regular part of the recruiting process and mitigations are in place analyzing the potential applicant pool and any down selection in the recruiting process.

## **Organizational Development**

**At AURA's NASA-funded Center (STScI)**, the Human Resources (HR) staff continues to provide orientation and consultation to hiring committees, hiring managers, promotion deliberations, recognition and bonus awards, etc. on mitigation of bias and best practices in the selection process. Over the past year, HR has been deeply involved in change management training, organizational redevelopment consultation, team building, soft skills training (communication, leadership, conflict resolution, generational differences in work styles, meeting planning, trust-building).

HR also arranged for 6 Safe Zone trainings to be held at STScI. These trainings, developed for the LGBTIQ community, teach useful skills for interacting across differences as well as demonstrating respect and inclusion. All senior leadership has attended as well as over half of the Institute staff.

Additionally, HR has partnered with an outside consultant engaged to address leadership development and decision-making for the senior leadership team. Lastly, STScI HR worked with a new vendor on developing mandatory online, interactive anti-harassment training which will be released AURA-wide in January/February, 2017.

**At AURA's NSF funded Centers (NOAO, NSO, Gemini, and LSST)**, Human Resources staff has focused on development of the talent pipeline, succession planning and a diversity staffing focus in 2016. This has all taken place during a period of historically significant change in ground-based astronomy.

HR has been engaged with over 700 staff across our sites in North and South America, in understanding expectations for our workplace culture and to educate all of our employees in our Standards of Workplace Conduct policy in order to demonstrate “our commitment to ensure a working environment of the highest professional and ethical standards of conduct and one that is fair and humane for all of us.”

Additionally, HR is partnering with the NSF centers to revise the performance review system incorporating a diversity competency measure for all staff.

## **Summary**

Over the past eight years, AURA's leadership focus on the workplace and its future workforce has resulted in some important gains.

- AURA demographics have improved, but some of our Centers still lag the general population of comparable organizations. In some areas, such as women in *Executive and Senior*

*Management.* AURA outperforms the national average for percentage of women – see Figure 4.

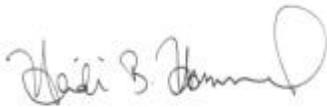
- Our focus continues on proactive recruiting at all levels, coupled with training and mitigation of unconscious bias. It is anticipated that this will lead to further improvements in AURA demographics.
- AURA’s research in understanding the systematic effects in time allocation on women have been replicated by other facilities within the astronomy community. We continue to investigate this, and to adopt methods to mitigate implicit bias.
- Key emphasis is being placed on the diversity of AURA Governance through diversifying the nomination pools.
- AURA’s effort to cultivate a more diverse workforce is a high priority for all AURA Centers.
- AURA managers continue their proactive engagement at national meetings related to diversity, and participate in other opportunities for community leadership in this area.

Our Workforce and Diversity Committee advises that continued progress should be assessed over a minimum of a ten-year period. I thank the members of the Workforce and Diversity Committee and all of the AURA personnel who have contributed to these activities.



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