



Association of Universities for Research in Astronomy

WORKFORCE AND DIVERSITY PROGRESS REPORT

Calendar Year 2015

Dear Colleague,

This letter summarizes for AURA employees and governance the actions we have taken in 2015 to broaden participation in AURA activities and to work towards the development of a diverse future workforce. This report marks the seven-year mark 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 that reports to the AURA Board of Directors. 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 observatory locations. It reviews and examines issues of diversity 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 Sciences¹. There are over 300,000 workers in this category, of whom AURA employs about a thousand.

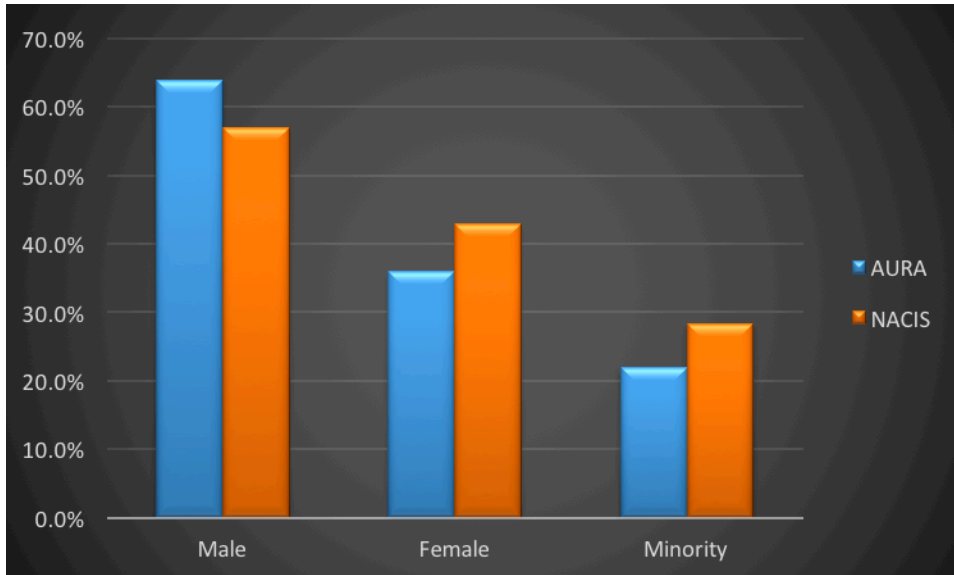


Figure 1: Overall AURA demographics in 2015 compared with national level

As seen in Figure 1, in 2015, the percentage of women and minorities in AURA lagged slightly compared with the national percentages for organizations in our category.

However, AURA has shown improving trends in important categories over the past five years. For example, the 2015 data show a slight (1.6%) increase in women since 2009.

Figure 2, similarly, illustrates a positive trend over the past six years in the percentage of AURA employees who are categorized as under-represented minorities. 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 percentage of employees who identify as two or more ethnicities has also grown. Overall the percentage of employees classified as an under-represented minority has grown from 17% in 2009 to 22% in 2015.

¹ See <http://www1.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2014/index.cfm>
EEOC data generally track NSF Science and Engineering Indicators where data can be compared.

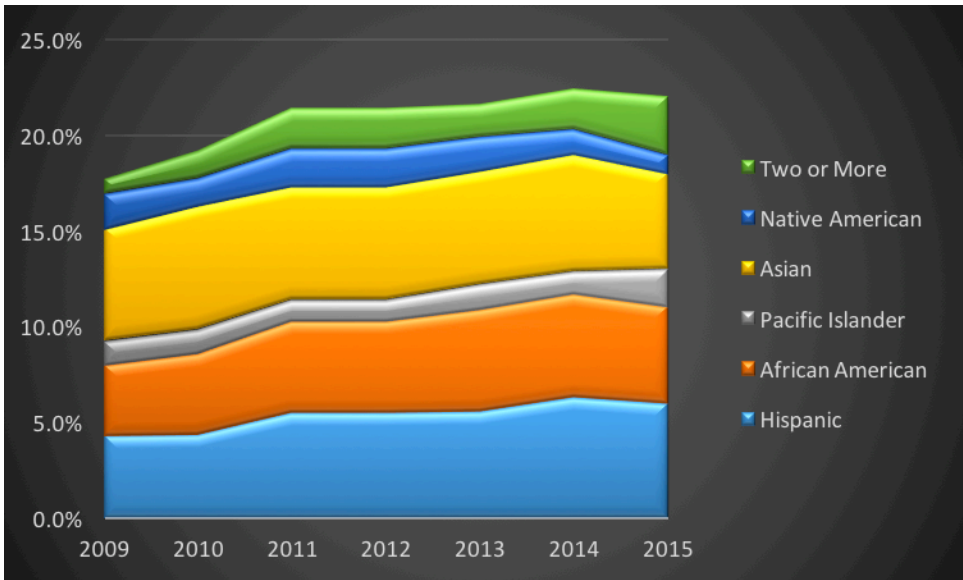


Figure 2: AURA-wide percentage of minorities

Over the past five years, AURA has focused on the recruiting and retention of women and under-represented minorities in its top management ranks. Figure 3 shows the 2015 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 35%.

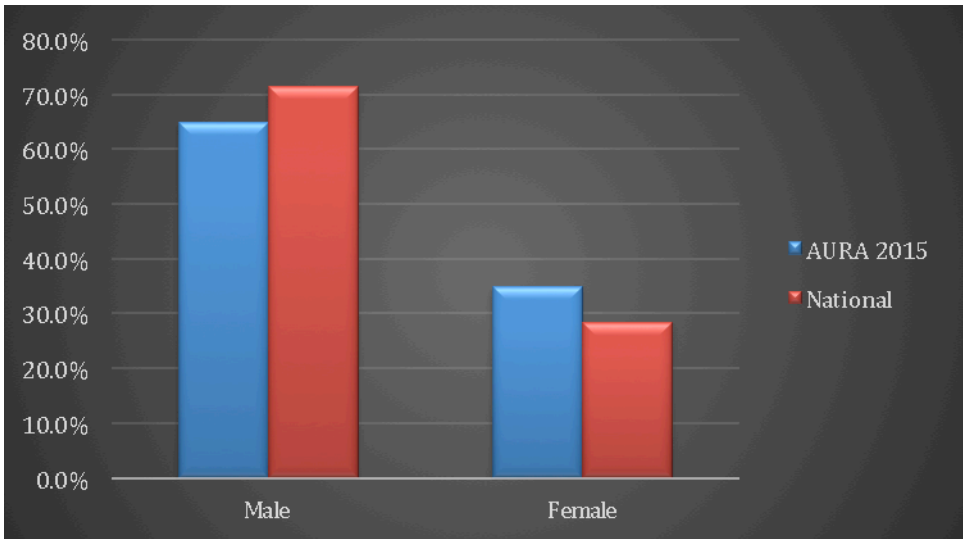


Figure 3. Gender distribution for executive and senior management in 2015

Figure 4 further shows that the percentage of women in this category has increased since 2009.

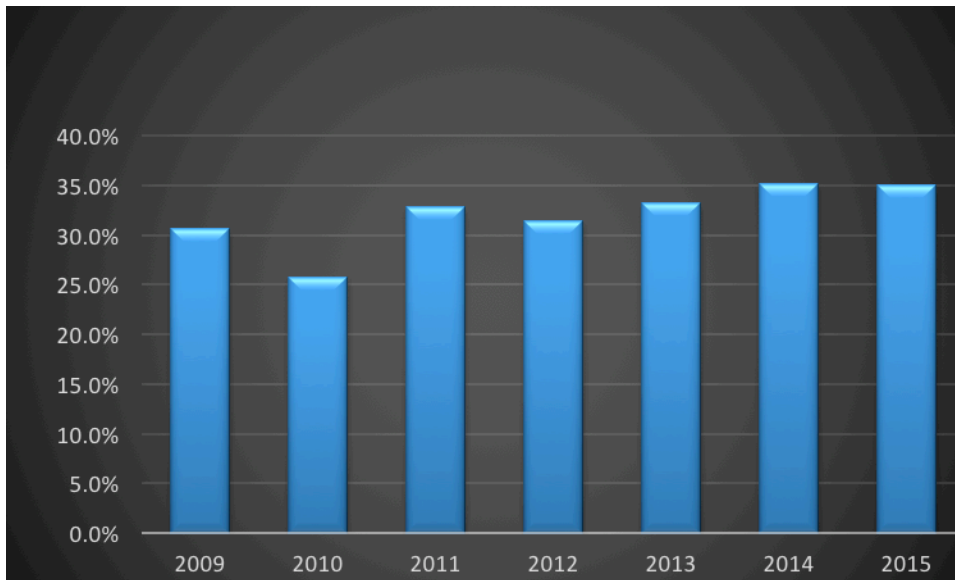


Figure 4: Trend in Women Executive/Senior Managers in AURA Observatories

To maintain this trend, AURA places 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 biases held by both men and women. Consequently, AURA includes within its processes a Recruitment Guide for search committees² and has instituted a policy of orienting 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 including promotions, awards, project assignments and tenure.

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

In 2015, AURA conducted a search for a new Director for the Space Telescope Science Institute. The search committee received an orientation to unconscious bias and best practices in recruitment. The applicant pool included 14 individuals: 12 males and 2 females. Of these, 3 identified as being an under-represented minority. The pool selected for interview included 8 males and 2 females. One of the interviewees identified as an under-represented minority. The process resulted in the selection of a non-minority male.

² [http://www.aura-astronomy.org/diversity/documents/AURA Recruitment Guide - Final.pdf](http://www.aura-astronomy.org/diversity/documents/AURA%20Recruitment%20Guide%20-%20Final.pdf)

STEM Staff

Science and engineering staff represent a special category of employee relevant to NSF and NASA diversity goals. Figure 5 shows the gender/ethnicity breakdown for science research staff for AURA observatories.

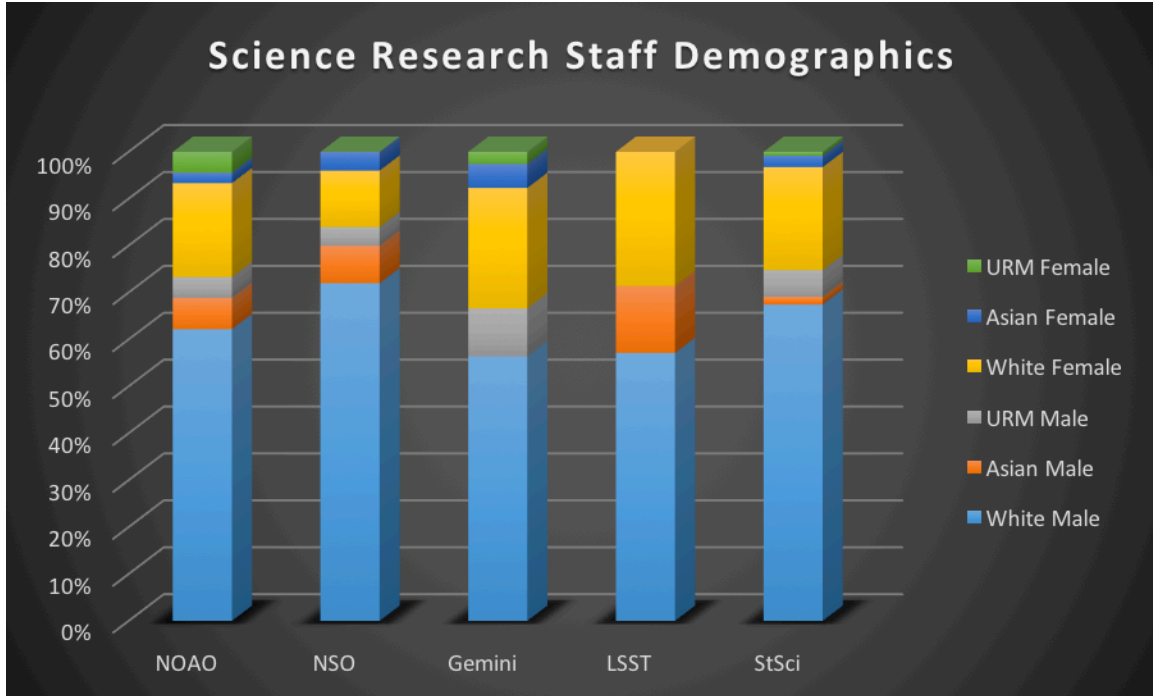


Figure 5: Science Research Staff Demographics for 2015

Engineering staff tend to reflect local workforce 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 6 shows the breakdown for AURA engineering staff. During 2015, AURA further developed its relationship with the Society of Women Engineers (SWE) through sponsoring female engineers to attend the SWE annual conference, to support professional development, develop recruiting contacts, and publicize engineering careers at AURA Centers.

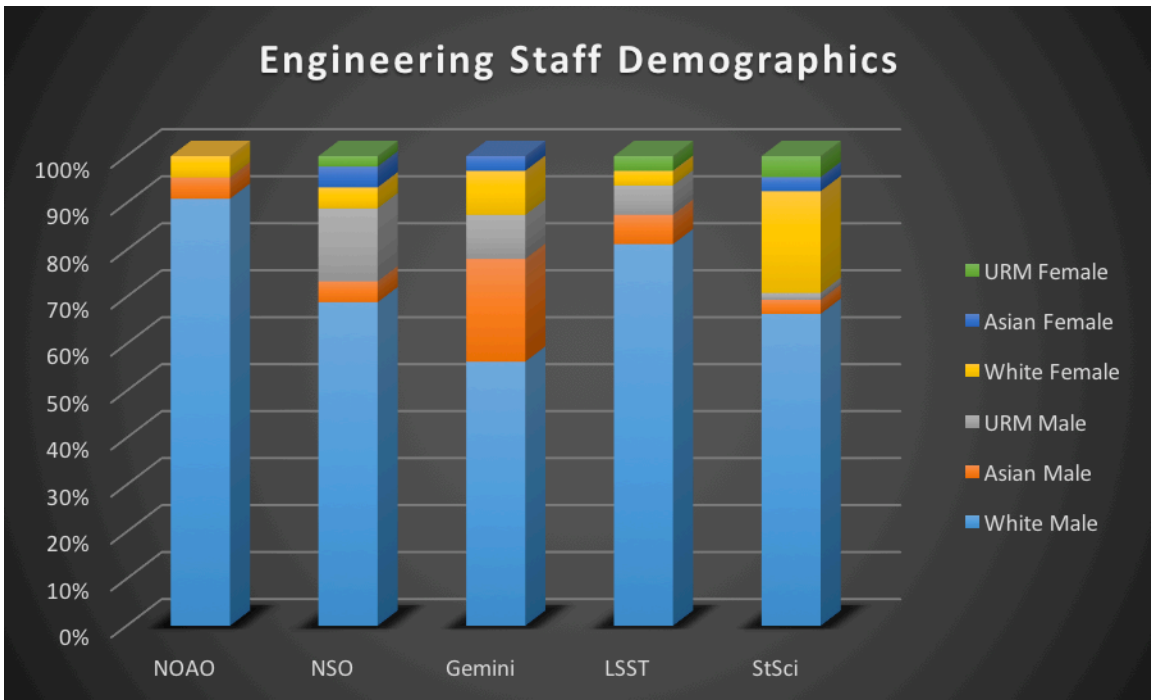


Figure 6: Engineering Staff Demographics for 2015

Overall gender representation for AURA STEM-related occupations is shown in Figure 7.

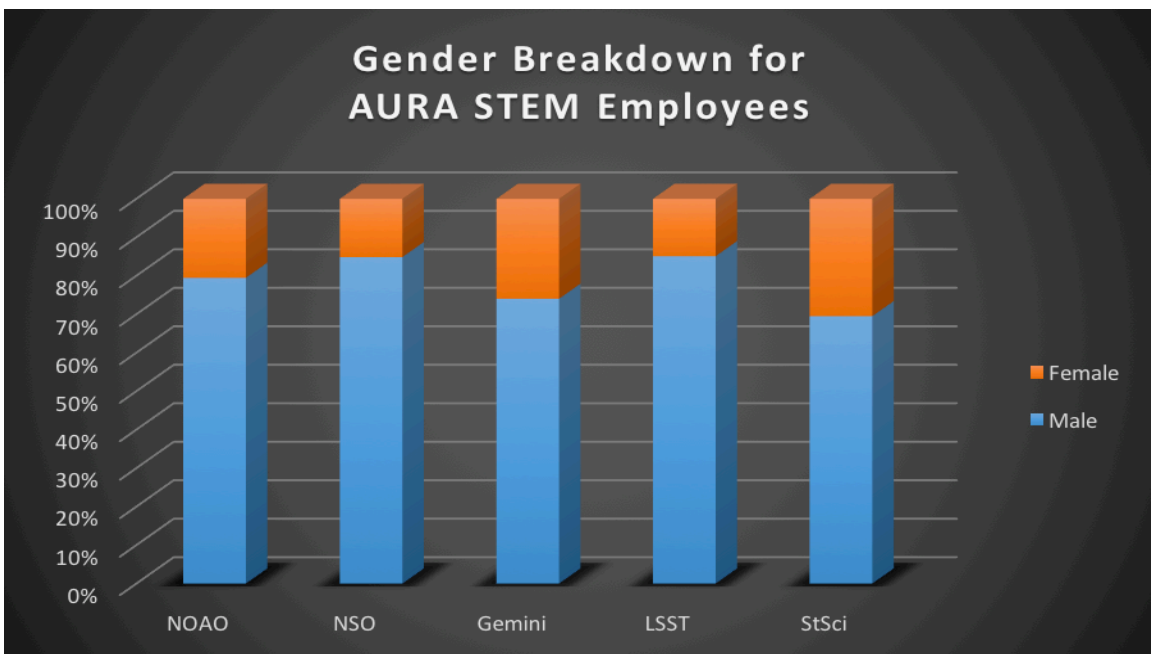


Figure 7: Gender Breakdown for AURA STEM Employees for 2015

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 minorities in order to improve diversity in the overall composition of its workforce.

- For STScI in 2015, there were 94 new hires, of whom 35 were women and 24 were under-represented minorities. Of 51 promotions, 25 were women and 10 were under-represented minorities.
- For LSST in 2015, the workforce increased to over 50. Of the 18 new hires (transfers within AURA and external), 5 were women and included 5 under-represented minorities. There were no promotions.
- For NSO in 2015, there were 20 new hires (transfers within AURA and external), of whom 6 were females and 3 were from under-represented groups. There were three promotions, one of whom was female/minority.
- For NOAO in 2015, there were 27 new hires (transfers within AURA and external), of whom 5 were female and 5 were under-represented minorities. There were also 6 promotions, of whom 3 were female and 3 were under-represented minorities.
- For Gemini in 2015, there were 19 new hires, of whom 5 were female and 7 were from under-represented groups. There were also 5 promotions, of whom 1 was female and 2 were from under-represented groups.

AURA Governance Demographics

AURA has also sought to increase diversity within its governance: board, councils, and 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 8, 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 – 2015.

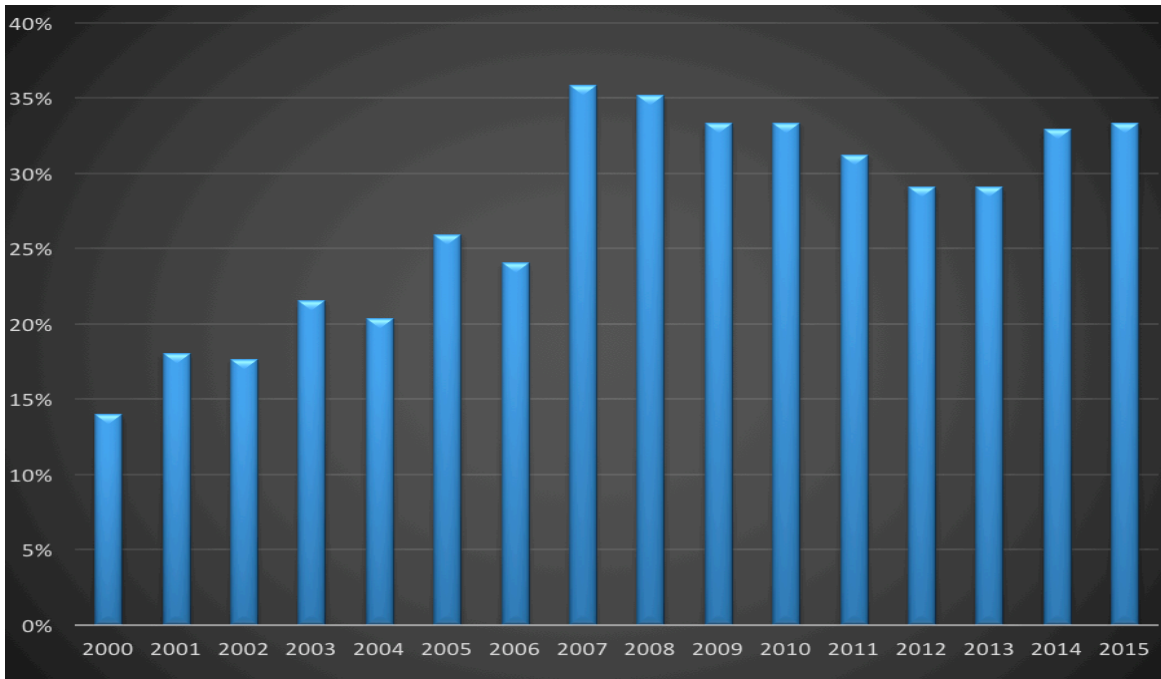


Figure 8: Women in AURA Governance

Growing a Future Workforce

AURA focuses its Center-based outreach and education programs to engage under-represented populations and under-served geographic areas and institutions. At the K–12 level, AURA’s Centers nurture the seeds of interest in science and promote STEM-related career options. We do not discuss those programs in depth in this report, but rather focus on activities pertinent to the current workforce.

Advanced Student Activities

AURA Centers offer a valuable research experience through programs that complement academic and career development at all levels. Student intern programs provide potential future hires with direct experience in and exposure to the observatory working environment at major public facilities.

Although not formally a broadening participation program, NSF’s Research Experience for Undergraduates (REU) has been one of the most effective tools used by AURA, in order to contribute to STEM workforce development through research-based training and education. For STScI and Gemini, which are unable to formally participate in the REU program, comparable active intern programs have been established.

NOAO

During 2015, NOAO-North hosted 6 REU students of which 2 were female and 4 were male. At NOAO-South, there were 6 REU students, including 2 female and 1 minority student. For the Chilean Prácticas en Investigación en Astronomía (PIA) program there were 2 students: 1 male from Universidad Católica and 1 female from Universidad La Serena. In recent years, the PIA program has increased acceptance of students from universities around the country, not just in Santiago. CTIO continues to have a larger fraction of Chilean applicants from diverse regions of Chile (around 30).

NSO

The NSO mentored 5 Summer Research Assistants including 4 undergraduate student SRAs (2 women and two men) and a male graduate student. Working with NSO advisors, a female Akamai student is about to finish her Ph.D. at the University of Arizona, a male student just finished his Ph.D. at New Mexico State University, an African-American female is continuing her thesis research at Vanderbilt, and a female U. Colorado is starting graduate work with NSO.

The NSF did not fund the NSO REU program in the summer of 2014. After an extensive re-working of the program, the NSF funded the new NSO REU proposal for a two-year transitional REU program during the summers of 2015 – 2016. Changes to the REU program included: directly specify the NSO mentors as Co-Is in the proposal; increase the number of REU students from 6 to 8; remove the Research Experience for Teachers (RET) program from the proposal; and several other reworked budget items. The proposal was intended not only to realign the NSO REU program with the new NSF requirements, but to develop the concepts needed to successfully transition the NSO program from a Tucson/Sunspot based program to a Boulder-based program.

The NSF funding was received just prior to the student application deadline. Thus no active recruitment was possible, and even advertising for the REU program needed to include phrases such as “if funding becomes available.” For this reason, the number of applicants for the 2015 program was only 24, an enormous drop from the 106 applicants to the 2013 program. NSO selected 8 students. We expect many more applicants for the summer 2016 program.

Dr. Kathy DeGioia Eastwood (NAU) was hired to provide an annual review of the NSO REU program. Her executive summary for the program included this comment: “A set of dedicated and enthusiastic mentors; students who are satisfied with the experience, and proud of the progress they have made.”

LSST

LSST during 2015 hosted a student from the IINSPIRE program, a senior in aerospace engineering at Iowa State University, served an IINSPIRE internship with LSST May through July.

Gemini

For Gemini, during 2015 there were 15 interns (7 males, 8 female) who gained experience in STEM occupations in the Gemini workplace. The interns came to Gemini through a variety of programs in Hawai'i and Chile as well as partnerships formed within the Gemini Partner host countries. Two intern students from the IINSPIRE (Iowa, Illinois, Nebraska STEM Partnership for Innovation in Research and Education) Program came to Gemini from Iowa State where they were majoring in Aeronautical Engineering. The IINSPIRE program is an NSF LSAMP alliance among 16 universities and colleges working together to broaden the participation of under-represented minorities in STEM.

Space Telescope Science Institute

At STScI, 15 interns were selected as part of the Space Astronomy Summer Program (SASP), of whom 6 were female and 6 identified themselves as being from an under-represented group.

STScI initiated a new student partnership with the National Astronomy Consortium (NAC). This program is led by the National Radio Astronomy Observatory (NRAO)/Associated Universities, Inc. (AUI) and includes the National Society of Black Physicists (NSBP) and minority and majority serving universities. Its purpose is to increase the number of under-represented students in STEM fields and traditional academic pipelines through partnerships for research experiences, etc. STScI incorporated a cohort of 3 students, 2 males and 1 female, (all identifying as under-represented minorities) from this program into our SASP program for summer 2015. The students will remain working with their mentors throughout FY16.

Other Workforce Development Activities

Akamai

AURA Centers have also reached out in other ways. 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 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 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 National Solar Observatory (NSO) and the University of Colorado (CU) Boulder held a 1.5-day workshop in June 2015 to discuss the next steps for the graduate education component of the growing NSO/CU collaboration. At this workshop, the formerly known as Collaborative Graduate Education Program (CGEP) was renamed the Hale COLLAGE (COLLABorative Graduate Education) Program. As of June 2015, the Hale COLLAGE consortium consisted officially of four universities (CU, NJIT, NMSU, MSU) and two national labs (NSO, HAO). The plan is for the program to grow. The motivation of the program continues to be the same – address the mismatch between the need for advanced, graduate-level training in solar and space physics (to build up the next generation of DKIST observers, for example) and the ability to meet that need at any single institution.

STScI Engineering

In 2015, 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 2015, 2 individuals were placed with STScI, one minority female and one non-minority male.

Institutional Initiatives

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

Response to Sexual Harassment Case in Astronomy

In the wake of the Geoff Marcy resignation from UC-Berkeley³, there has been a great deal of discussion in the media, in the science field, and specifically in the field of astronomy on this important subject.

In 2014, AURA had defined a clear Standards of Conduct Policy⁴. It sets forth general expectations for the behaviors expected in a modern workplace such as AURA, and it

³ <http://www.dailycal.org/2015/10/15/light-shed-dark-matter-campus-professor-geoffrey-marcys-resignation-comes-concerns-sexual-harassment-sciences/>

⁴ [http://www.aura-astronomy.org/about/policies/Section B/B25\) B-XXV-Standards of Workplace Conduct.pdf](http://www.aura-astronomy.org/about/policies/Section B/B25) B-XXV-Standards of Workplace Conduct.pdf)

addresses specific issues such as harassment, bullying, consensual relationships, retaliation, and remedies for complaints.

In direct response to 2015 events, AURA affirmatively restated its commitment and expectations for appropriate work place behavior, specifically with respect to harassment and bullying. AURA also continued to develop additional training and reporting procedures for managers and staff. Utilizing the community discussion as an opportunity for “lessons learned,” each AURA Center is evaluating how it can further enhance a safe, respectful and inclusive workplace.

Systematic Effects in Telescope Time Allocation

Analyses over the past few years have indicated the presence of a systematic difference in the success rate of HST proposals with female Principal Investigators (“PIs”) with respect to those with male Principal Investigators.

There have been some indications in the data that proposals with female PIs were less successful than those with male PIs. (Other Time Allocation Committees, such as for NOAO, show similar trends.) The origins of this effect are not yet well understood, but, as reported to the Space Telescope User Committee (STUC), more detailed investigations suggest that the difference may increase with the seniority of the proposer.

STScI has taken a number of steps to minimize the potential impact of unconscious biases, including briefing the HST Telescope Allocation Committee and adjusting the format of the submitted proposals to de-emphasize the name of the PI. As Figure 9 below shows, those actions have not had noticeable effect on the systematic difference noted.

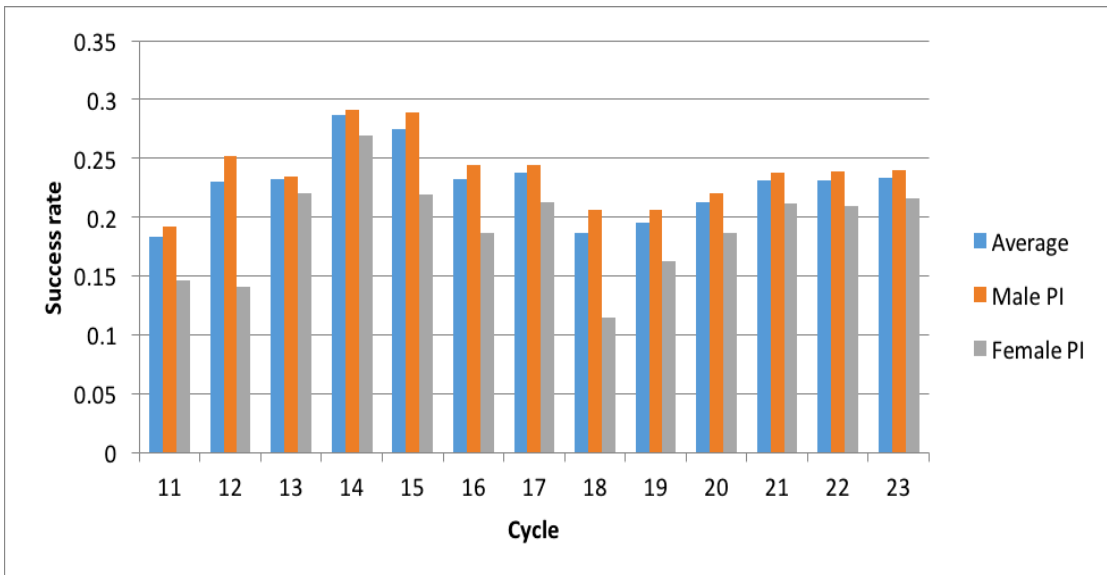


Figure 9. The success rates of proposals for HST Cycles 11 through 23.

In consequence, following a recommendation from the Space Telescope User Committee, starting in Cycle 24 (January 2016), HST proposals distributed for review will no longer

identify the PI of the proposal; team members will be listed in alphabetical order, with initials given instead of first names. AURA continues to examine these issues, educate the committees and explore possible mitigations.

We note that proposals made by female PIs appear to be on the rise. There are many factors that influence this, including appreciation of the impact of unconscious bias. We inform Time Allocation Committee members of these statistics and to inform them of the possible role unconscious bias may be having on these results.

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 2015, the AURA member representatives were given a presentation on the role of unconscious bias, and elections were conducted based on defined criteria rather than hearsay.

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 and for hiring managers 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.

Community Engagement

AURA staff are engaged in a wide variety of activities that relate to workforce development and diversity. We list some of these here.

AURA helped sponsor the [Inclusive Astronomy 2015 Workshop at Vanderbilt University](#). Dara Norman, Suzanne Jacoby, and John Leibacher (the NOAO, LSST, and NSO Diversity Advocates) and Sheryl Bruff, Human Resources Chief (and former Diversity Advocate) for STScI, attended. Many of the ideas, issues raised and recommendations were brought back to the AURA Centers.

AURA was a co-organizer of, and participant in, the first Chile–U.S. Astronomy Education Summit in March 2015. Led by Associated Universities Inc. (AUI), AURA, Carnegie Institution for Science, the United States Embassy in Chile, and the Chilean National Commission for Scientific and Technical Research (CONICYT), the summit took place at various locations throughout Chile. A traveling team of 35 astronomy education and outreach experts from Chile and the United States met with educators, administrators, and other outreach professionals to build capacity and to improve communication, coordination, and collaboration between Chile EPO initiatives and between Chile and the United States. LSST Manager for EPO, Suzanne Jacoby, participated. More information can be found at <http://www.astroeducacion.cl/>

NOAO Diversity Advocate Dara Norman participated in a number of diversity activities, including the following:

- AAS (Demographics, Council)
- Co-planning for the AAS Committee on the Status of Minorities in Astronomy (CSMA) meet-and-greet with local URM students at the Seattle AAS meeting
- Initiated white paper for NRC panel on ‘Maximizing LSST’s Scientific Return: Ensuring Participation from Smaller Institutions’
- Organizing committee for Inclusive Astronomy Conference held at Vanderbilt University.

NOAO staff helped teach astronomy at the Tohono O’odham Community College.

Other NOAO staff have actively participated in staff teaching of astronomy at the Tohono O’odham Community College. There was a large initial class: 14 students and only 2 have dropped out. There will likely be a request for the class to be repeated. Students made 3 trips to Kitt Peak, including observing with research telescope (WIYN/4m, 0.9m, McMath-Pierce). These students consistently cite trips to KPNO as a highlight of the class.

STScI, NOAO, and NSO staff attended and promoted career opportunities at events for under-represented minorities. These include the National Society of Black Engineers Conference, the National Society of Black Physicists Conference, the American Astronomical Society Winter Conference and the Society of Women Engineers Conference. Female and minority members of the engineering and science support staff partnered with Human Resources for these career events.

STScI Diversity Advocate Max Mutchler’s activities included the following:

- Exploring new staffing strategies within STScI and across AURA Centers
- Participation in a discussion on implicit bias with visiting lecturer Meg Urry
- Participation in JHU Diversity Group meetings
- Attending the National Society of Black Physicists Conference in Baltimore
- A Skype session on career paths with students in the Pre-Major in Astronomy Program (Pre-MAP) at the University of Washington
- Scheduling a visit in January 2016 to the Graduate Resources Advancing Diversity with Maryland Astronomy and Physics (GRAD-MAP) winter session

STScI staff participated in a wide range of local activities:

- Represented AURA at the National Conference on Career Opportunities for Students with Disabilities in Philadelphia, PA.

- Continued to expand and stabilize its strong ongoing partnerships with area colleges, universities, and city/county organizations in an effort to generate a consistent pipeline of interns, particularly in science, engineering, IT, and outreach. Relationships exist with the University of Maryland, Baltimore County (UMBC), Capitol Technology University (formerly Capitol College), Morgan State University, Loyola College, Stevenson University, Johns Hopkins University, the Mayor of Baltimore's YouthWorks Program, Junior Achievement, Academy of Finance, City Neighbors School, and My Sister's Circle.
- Sponsored 15 undergraduate college internships throughout the year (in addition to the summer program) of which 6 were women and 2 identified as being from an under-represented group.
- Forged new partnerships with organizations serving individuals with disabilities and veterans. These included Maryland Veterans Affairs, the Maryland Department of Rehabilitative Services, and Career Opportunities for Students with Disabilities. Four veterans were hired into full-time positions at STScI. STScI continued providing work readiness activities and internships for individuals with special needs.
- Continued to collaborate with Johns Hopkins University to provide SafeZone training (an ally support program for the LGBTIQ community) to more than 50 staff members. Sheryl Bruff, HR Manager and former Diversity Advocate for STScI, became one of the first members of the newly formed Astronomy Allies group supporting victims of sexual harassment in Astronomy.

Summary

Over the past seven years, AURA's 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 top management, AURA seems to lead the community.
- 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.
- 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. Our engagement with students through the REU, SASP, and PAARE programs, and through new partnerships such as IINSPIRE, will expand

our interactions with under-represented minorities, as well as with geographic and institutional sectors that have not traditionally had high participation rates in STEM fields.

- 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.

Matt Mountain
President
Association of Universities for Research in Astronomy