



Association of Universities for Research in Astronomy

WORKFORCE AND DIVERSITY PROGRESS REPORT

Calendar Year 2012

Dear Colleague,

This letter is intended to summarize for AURA employees and governance the actions we have taken in 2012 to broaden participation in AURA activities and to work towards the development of a diverse future workforce. Over the past four years, AURA has renewed its commitment to achieve and strengthen:

- *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 underrepresented 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 underrepresented 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.

AURA Demographics

AURA Employees

AURA has made a concerted effort to measure our progress in achieving these goals in a consistent and meaningful way. We validate and track diversity in the workforce of

AURA employees, the makeup of the collection of individuals from the community that participate in its governance, and in the students we influence in STEM careers.

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 287 thousand workers in this category, of whom AURA employs about a thousand.

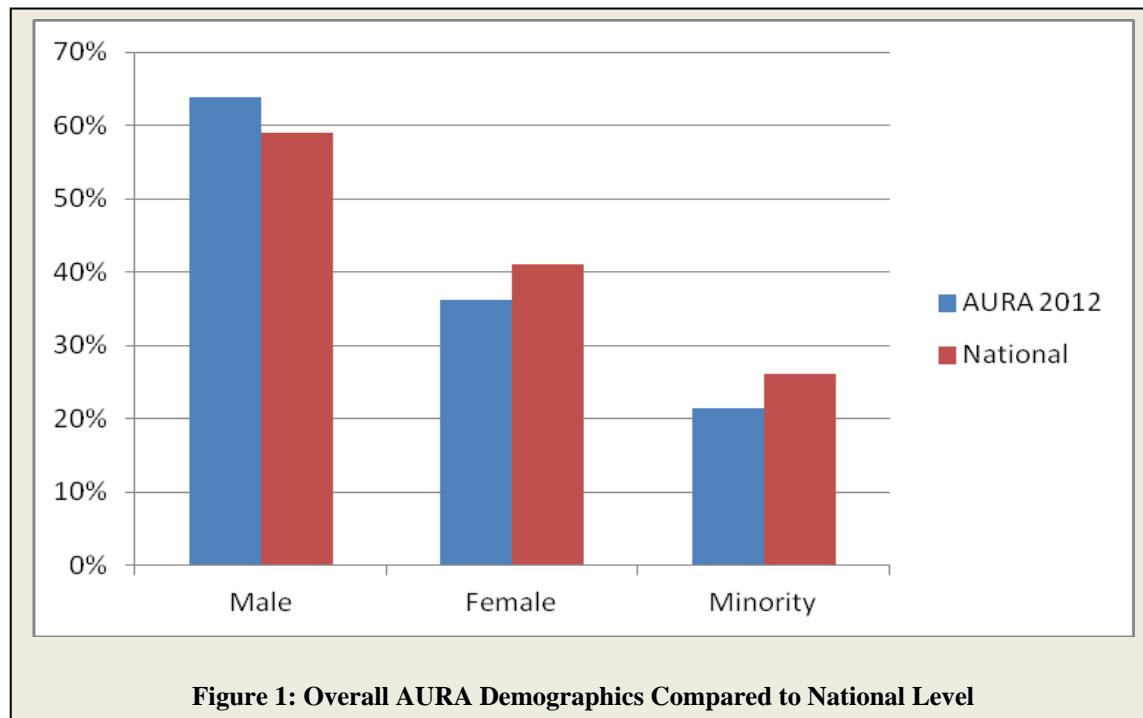


Figure 1: Overall AURA Demographics Compared to National Level

As seen in figure 1, in 2012 women and minorities in AURA lag behind the national percentages for organizations in our category. AURA demographics have improved slightly in the percentage of women and minorities over the past four years with female participation increasing from 35% to 36%, and minority participation increasing from 19% to 21% (primarily an increase in those reporting African American and Native American ethnicity). These increases slightly exceed the changes in the national average over this same period.

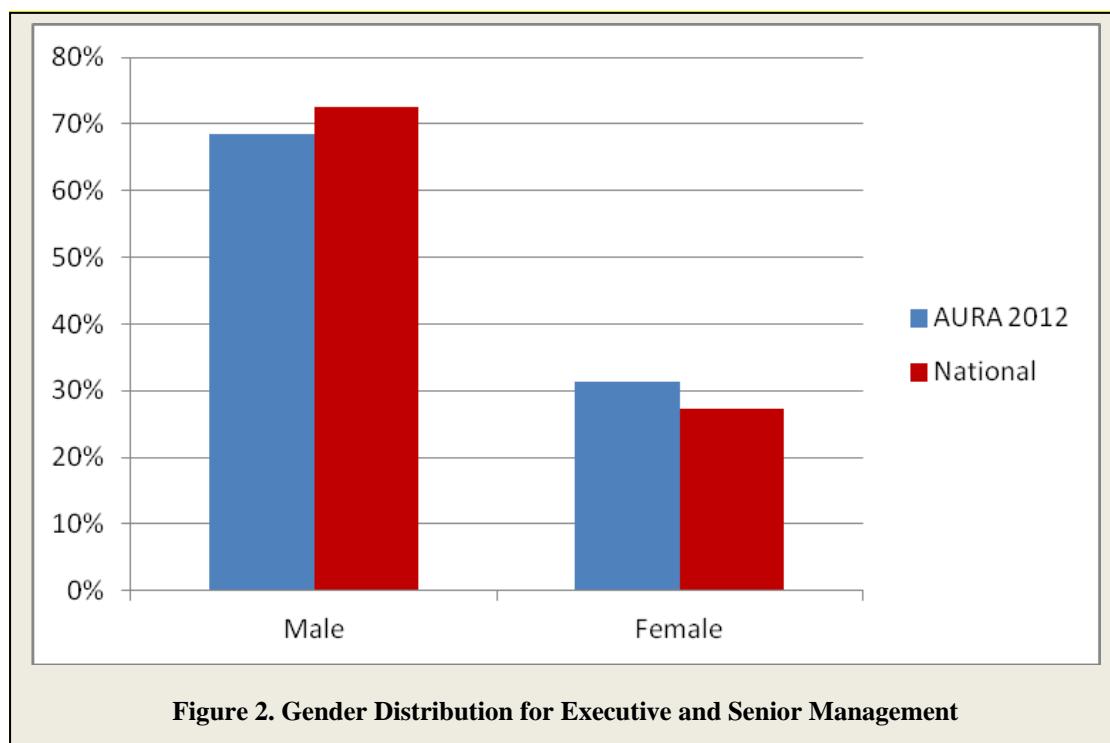
Although these trends appear in the right direction, AURA lags in the national context. It has been observed that this reporting category is strongly affected by the biological science organizations, which typically include a higher percentage of women and minorities. Nevertheless, AURA clearly recognizes that its demographic makeup is in need of improvement.

In tracking demographic trends for underrepresented minorities, it is important to distinguish gender factors as well. Of the 21.4% minority participation rate for AURA in

¹ See <http://www1.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2009/index.cfm#centercol>. Generally, EEOC data lag the current employment picture by about two years.

figure 1, 10% are female and 11% are male. For the national picture, of the 26% shown in figure 1, female and male participation rates are, respectively, 12 and 14%.

Since the initiation of these annual reports, AURA has also focused on ensuring that top management ranks receive attention in terms of recruiting and retention of women and minorities. For the highest employment classification, *Executive and Senior Management*, figure 2 shows the gender demographics. This is a subset of the overall comparison in figure 1, and represents about 7% of the AURA workforce. As seen, in 2012 AURA exceeds the national statistics for gender diversity in management ranks, as has been the case in the past several years.



These comparisons represent AURA as an organization that employs scientists, engineers, and a wide variety of other professional and craft persons. The NSF has maintained a statistical base for scientists and engineers employed in STEM fields. Although exact comparisons with this data base are difficult, the trends and observations reflect the AURA experience. (see 2012 S&E Indicator sidebar)

Senior Executive Searches and Recruitments

In order to sustain and improve the participation of women and minorities in senior management ranks, special attention is needed during the search and recruitment process. The need to ensure diversity on a search committee in order to successfully recruit women and minorities has been widely acknowledged. It is recognized that ensuring the diversity of search committees alone is necessary but not sufficient to achieve a more diverse workforce. Focused efforts must be made to ensure the diversity of applicant

2012 Science and Engineering Indicators

Women remain underrepresented in the S&E workforce, although to a lesser degree than in the past

Women constituted 38% of employed individuals with a highest degree in an S&E field in 2008, but their proportion is smaller in most S&E occupations.

From 1993 through 2008, growth occurred in both the share of workers with a highest degree in an S&E field who are women (increasing from 31% to 38%) and the share of women in S&E occupations (increasing from 21% to 26%).

Female scientists and engineers are concentrated in different occupations than are men, with relatively high shares of women in the social sciences (53%) and biological and medical sciences (51%) and relatively low shares in engineering (13%) and computer and mathematical sciences (26%).

Race and ethnicity are salient factors in rates of participation in the S&E workforce.

Hispanics, blacks, and American Indians/Alaska Natives make up a smaller share of the S&E workforce, with 9% of workers in S&E occupations and 11% of S&E degree holders in 2008, than their proportion in the general population, with 26% of U.S. residents from ages 20 to 70.

Asians work in S&E occupations at higher rates (17%) than their representation in the U.S. working-age population (5%). Asians are particularly highly concentrated in computer and information science occupations (22% Asian).

Within every S&E occupation, more than half of all workers are non-Hispanic whites.

pools and “short lists”. Recently, AURA has also instituted a policy of introducing search committees to the basic findings on unconscious bias. Guidelines for search committees are included under “Resources” on the AURA website at <http://www.aura-astronomy.org/about/diversity.asp>.

In 2012 AURA conducted major searches for two Directorships for NSO and for LSST. Of the two ad hoc Search committees, 4 out of the 11 members of the NSO Search Committee, and 2 out of the 9 members of the LSST Search Committee were women. In each search, the President and/or the Search Committee proactively contacted qualified women to solicit their application, and the position announcement was directed to various groups and committees that could possibly identify additional candidates. Finally, in order to exploit other possible avenues for identifying candidates, both of these processes also included a new feature in which nominations from the community were publicly solicited. In the case of the NSO Director Search, 8 of the 59 formal requests for application were made to women candidates. In the case of the LSST Director Search, 2 of the 16 formal requests for application were made to women.

The fields of solar astronomy and high energy physics are particularly difficult in this regard and the number of plausible applicants was dramatically smaller than has been the case for other Directorships. In neither case did this process result in formal applications from women candidates.

In addition to these two major searches, AURA approved the selection of Dr. Kathryn Flanagan as Deputy Director of STScI in 2012. NOAO will soon begin a search for the CTIO Director which is anticipated to be concluded in 2013. Of the 8 search committee members, 3 are female.

This year STScI also conducted searches for two senior positions: the head of the Information Technology Services Division (ITSD) and the head of the Office of Public Outreach (OPO). Search committees were formed for both initiatives ensuring diversity

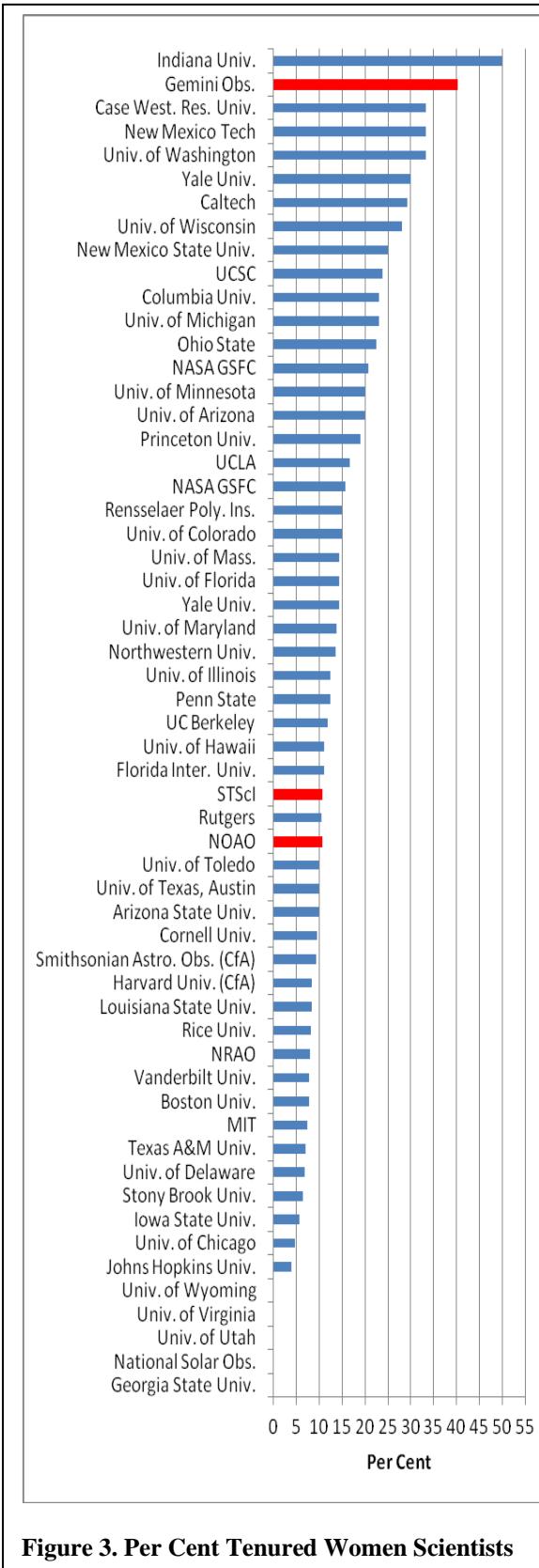


Figure 3. Per Cent Tenured Women Scientists

in gender and ethnicity. For the ITSD position, the committee was comprised of 8 individuals, 4 of whom were women and 1 identified as a minority. For the OPO position, the committee was comprised of 7 individuals, 5 of whom were women and 2 identified as minorities. In each search, the Search Committee proactively contacted qualified women and/or minorities to solicit their application, and the position announcement was directed to various groups and committees that could possibly identify additional candidates. Care was taken to ensure that the composition of the pool at each stage of the down-selection process (for phone screening and then in-person interviews) was reviewed to ensure adequate representation of female and minority candidates reflective of the applicant pool. The ITSD Head position was filled with a white male, the OPO Head position with an African-American male. An offer was extended to a white female for one of the positions but was declined for personal reasons.

Science Staff

Over the recent past, about 25% of astronomy PhDs have been awarded to women. AURA Centers have attempted to meet or exceed this pool average in its demographic makeup. For Gemini, for example, 34% of the PhD science staff are women. At NSO, 17% of the science staff are female. For STScI, 20% of the 84 science staff are female showing a rebound over the decade in its representation of women. At NOAO, 10 of 41 (or 24.4%) science staff are female.

One additional measure of the status of women within the scientific ranks is the percent of tenured staff who are women. Recently, the AAS Committee on the

Status of Women in Astronomy compiled a list of major astronomy institutions and the per cent of tenured faculty or staff who were female². Generally larger institutions employ more tenured women astronomers, but have greater difficulty achieving higher percentages. Figure 3 shows the institutions for which data is available and where AURA observatories fall.

Although the overall demographics are difficult to change over the short term, a key measure of future success for AURA centers is recruitment, hiring, and promotions.

- For STScI for 2012, there were 81 new hires, of whom 37 were female and 27 were underrepresented minorities. There were also 43 promotions of whom 17 were female and 5 were underrepresented minorities.
- For LSST for 2012, there was 1 new hire, of whom 0 were female and 0 were underrepresented minorities. There was also 1 promotion of whom 0 were female and 0 were underrepresented minorities. There are presently 12 employees of LSST, 4 female and 1 minority, with no significant staffing increase planned until 2015.
- For NSO, there were 15 new hires that were not temporary, of whom 4 were females and 2 were from underrepresented groups. There were three promotions, one of whom was female/minority
- For NOAO there were 17 new hires, of whom 3 were female and 4 were underrepresented minorities. There were also 13 promotions of whom 7 were female and 5 were underrepresented minorities (included overlapping categories.)
- For Gemini, there were 24 new hires, of whom 8 were female and 14 were from underrepresented groups. There were also 16 promotions of whom 4 were female and 6 were from underrepresented groups.

Overall, this represents about a 13% turnover in the AURA workforce, but of that, women and underrepresented minorities represent 37% and 34% of the replacements. Over the next year, sufficient recordkeeping will be in place to track the demographics of departures as well, providing a basis for an overall assessment of progress.

AURA Governance

Within its governance, AURA has also sought to preserve diversity. AURA's standing committees are listed at <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. As seen in figure 4, in 2012 the fraction of women and minorities fell below this informal goal.

The reasons for this are varied. In addition to diversity goals, governance choices are sometimes highly constrained by a variety of other factors (e.g. the need to include representatives from certain institutions, the need to include specific international

² See http://www.aas.org/cswa/percent_tenured.html

representatives, the need to gain specific scientific and management expertise, etc.). However it is important to reverse this decline in 2013 and restore participation levels to meet AURA's goals.

AURA's Member Representatives, who are not included in figure 4, generally reflect the makeup the senior levels of academia with less than 20% participation rate by women³. The 46 Member Representatives are appointed by the institutions themselves (i.e. by Presidents or Provosts) rather than by AURA. However, at the recommendation of the Workforce and Diversity Committee, AURA has now changed the form of the letter inviting the designation of Member Representatives to emphasize our desire to increase the participation of women and underrepresented minorities.

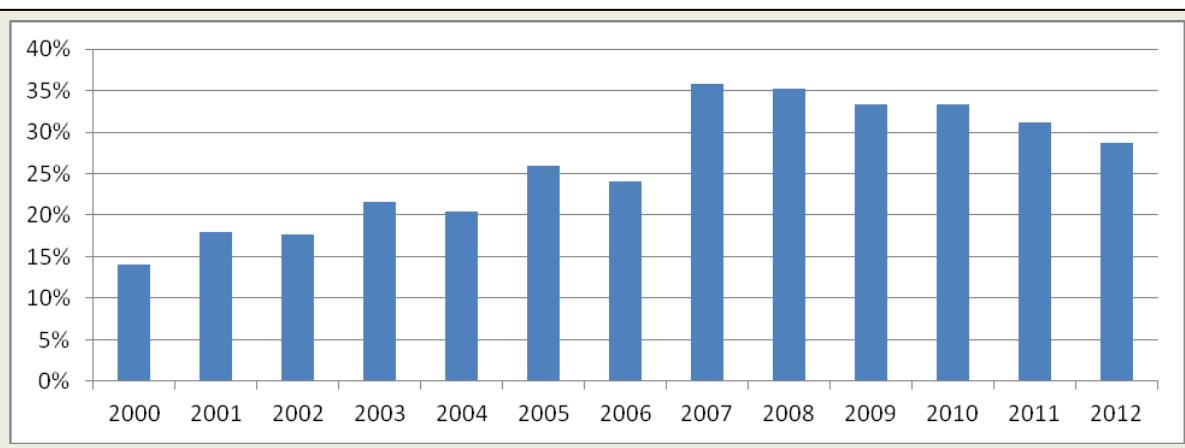


Figure 4: Women in AURA Governance

AURA has also taken steps to increase the representation of small and minority serving institutions by extending its membership to Fisk University in partnership with Vanderbilt⁴.

Growing a Future Diverse Workforce

AURA has focused its outreach and education programs to engage underrepresented populations, underserved geographic areas and institutions, and women. At the K-12 level, AURA has sought to provide the seeds of interest in science in general and future STEM related careers. At the advanced student level, AURA institutions offer a valuable research experience that complements academic and career development at all levels and also provides to a growing number of students a familiarity with the operating environment for major public observatories.

³ See, for example, <http://www.aip.org/statistics/trends/highlite/women3/figure1.htm>.

⁴ These institutions are presently engaged in pilot development work for LSST Data Management.

K-12 and Teacher Training Activities

NOAO

NOAO maintains a vigorous outreach effort in Arizona and Región de Coquimbo through a portfolio of programs that serve students directly and that provide professional development for teachers and informal science educators (e.g., museum and afterschool program educators). In Chile, a major effort is being made to train astronomy guides for public observatories.

NOAO continues working with various educational organizations on the Tohono O'odham nation. The EPO group is regularly asked to offer both school and after school programs, which they carry out as their first priority. While these activities are difficult to assess, independent positive comments about Kitt Peak's educational efforts are becoming very common.

NOAO also continues with an active Project Astro program that includes minority serving schools in the Tucson area. The EPO group has hired a Tohono O'odham student, who attends U Arizona, to assist part time with various educational programs.

Gemini

As an international institution, the Gemini Observatory's educational programming focuses primarily on its local host communities; Hilo and La Serena. For over 5 years, both Gemini sites have trained teachers to execute the Family ASTRO program, which has benefited hundreds of students and their families. Family ASTRO is part of a series of public education programs of the Astronomical Society of the Pacific (<http://www.astrosociety.org/education/family.html>). This program involves training educators in several basic areas of astronomy and physics by means of workshops aimed at "learning by doing" in a family-based environment in which each participating family group learns according to their own skills.

In addition to Family ASTRO and portable StarLab planetaria at both sites, Gemini's flagship local outreach program is the extremely successful Journey through the Universe.

Entering its 9th year in Hilo, in 2012 *Journey Through the Universe* is now expanded to Chile under the name Viaje al Universo Chile. Together these two versions of the program, which bring observatory scientists and staff into classrooms for an intensive week of activities, are impacting thousands of students, parents and educators annually.

These programs are expanding each year with Dr. Jeff Goldstein, Director of the National Center for Earth and Space Science, making the key-note address to launch the start of the 2012 program in Hawai'i. Also, during 2012, for example, the *Journey Through the*

Universe program in Hawai'i resulted in: 72 astronomy educators visiting over 8,000 children in 380 classrooms.

In 2012, the Viaje al Universo program, which engages Chilean students, teachers, and the public, ran for its second year; it featured dozens of classroom visits by scientists and educators. This combined with the annual AstroDay Chile program, which was founded by the Gemini outreach office, provided for some of the most significant outreach programs in Chile

STScI

The STScI Office of Public Outreach (OPO) spearheaded multiple new strategic partnerships and initiatives to bring both HST and JWST to underserved communities and diverse audiences, particularly to young women and Baltimore City youth. (Astronomy at the Harbor, Expanding Your Horizons Career Discovery Day, STEMcx, Girl Power, ISC Tech Expo, and Morgan State University's SEMAA Conference). Another new partnership established during 2012 is with after-school programs, which have the potential to impact local youth beyond the school day. OPO has implemented two workshops for after-school program providers in partnership with The After-School Institute, with plans in place to implement additional workshops in the future.

Another 2012 initiative that focused on engaging young women in STEM is the Astro4Girls pilot project. As part of its work with the American Library Association (ALA) and the SEPOF-Astrophysics Forum, OPO signed on to have HST be a "NASA Buddy" mission in support of Astro4Girls. OPO provided libraries with activity kits, educational support materials, and professional development for implementing STEM workshops for middle and high school girls. The student workshops culminated in family events during the month of March in celebration of Women's History month. Astro4Girls will continue in 2013.

In addition to the above, the STScI OPO group was extensively involved in providing professional development experiences for Baltimore City science educators. STScI maintained significant partnerships in STEM education and career development initiatives with Maryland Mathematics, Engineering and Science Achievement, the Maryland Business Roundtable for Education, NASA's Micro Observatory, and the Maryland Space Grant Consortium. OPO also maintains its Tactile Astronomy initiative that supports efforts in bringing the wonders of the universe to diverse learners.

STScI's Youth for Astronomy & Engineering (YAE) program, which focuses on community youth outreach, offered day and evening workshops and events for underrepresented youth as well as their families. This included the spring "Women's Science Forum", summer "Family Night at the Institute", fall "Parent & Daughter/Son Evening Under the Stars", and spring/fall monthly "YAE Astronomy Club" sessions. The percentages of attendees from Baltimore City have risen to 33% and Baltimore County to 25%. This is a significant jump from over 5 years ago when attendees from both demographic areas were less than 5%. In 2013, the YAE program initiatives will expand

to include a “YAE Engineering Club” for local youth as well as a Parent Workshop during the annual “Women’s Science Forum”.

NSO

During 2012, two middle school teachers participated in the NSO Research Experience for Teachers (RET) program. Of the two RET teachers, one was female.

NSO originally developed and makes available two educational modules to be used in the classroom at middle- and high-school levels. The Researching Active Solar Longitudes (RASL) project is geared towards improving students’ computer and analytical skills in addition to becoming familiar with fundamental solar science. The Data and Activities for Solar Learning (DASL) project provides classroom experience for middle or high school students to study the properties of the Sun’s magnetic cycle. This material continues to be used.

Project CLEA (Contemporary Laboratory Experiences in Astronomy) develops laboratory exercises that illustrate modern astronomical techniques using digital data and color images. They are suitable for high school and college classes at all levels, but come with defaults set for use in introductory astronomy classes for non-science majors. NSO provides a module using GONG data that allows the student to measure solar rotation and learn about the difficulties of inferring three-dimensional information from two-dimensional projections, and this year there was renewed interest in the transit of Venus. With the new solar cycle reaching an early maximum, we plan to get an addition sequence of images from this new sunspot cycle, so that we can get some spots at higher latitudes that industrious students can use to plot differential rotation.

Project ASTRO is a national program that improves the teaching of astronomy and physical science by linking professional and amateur astronomers with local educators. Each astronomer is matched with an educator in a one-on-one partnership and commits to visiting the educator’s students at least four times during the school year. NSO staff participates in the annual Project ASTRO two-day workshop hosted by NOAO and engages in mentoring throughout New Mexico and Arizona.

RASL, DASL, Project CLEA, and Project ASTRO can all be accessed through the NSO education and public outreach link at <http://eo.nso.edu/>. NSO is a strong participant in the Southwest Consortium of Observatories for Public Education (SCOPE). SCOPE is a consortium of research institutions in the Southwest that promotes public awareness of astronomy through access and education. This valuable collaboration results in excellent interaction among the public and educational outreach staff of these groups and the NSO.

LSST

The LSST Construction project became an AURA Center in October of 2011. It is different from other AURA Centers in a few significant ways. LSST is not yet an operating center; it is a construction project, working toward a federal construction start. Staffing is limited (11) and focused on designing and building the facility (and getting past the next review). LSST will not be a classic observing facility where a single team of investigators applies for time and conducts (private) research; LSST is a survey telescope, scanning the sky with a carefully programmed cadence to maximize the science output for multiple investigations, with all observations stored in a massively parallel database, open to US and Chilean researchers. LSST has always been designed as a public facility, open to researchers and the public.

An extensive, embedded program for Education and Public Outreach (EPO) has been part of LSST from the beginning, with shared planning and resources for all users. It is this integrated nature of education and research, coupled with the long lead time for planning and building community, that provide the tremendous opportunity for transformative EPO with LSST.

In the past, supplemental NSF funding supported faculty and student teams (FaST) at three LSST institutions during the summers of 2008, 2009, and 2010. Students and faculty members from institutions serving underrepresented populations spent ten weeks each summer at UW, BNL, and SLAC working on transient detection software, sensor technology, and calibration respectively. Nine students completed the summer opportunity.

Since April 2011, the quarterly publication of LSST E-News is translated into Chilean Spanish (by a volunteer) and posted online at <http://www.lsst.org/lsst/news/enews>.

Changing membership of the existing LSST EPO Outreach Advisory Board, and the creation of one or more EPO Science Collaboration Teams, are being explored as possible mechanisms for increasing diverse participation in LSST EPO.

The LSST project maintains a database of activities designed to increase participation of underrepresented groups at the 37 LSST Institutional Members as a possible source of leveraging opportunities for LSST EPO.

LSST is evaluating a range of future projects that are designed to promote awareness of STEM related matters, achieve mastery of some selected STEM skills, and inspire leadership. Pilot projects will be initiated when construction funding becomes available, with full implementation possible only after the LSST survey begins. These projects include:

- EPO Portal: a dynamic web portal that provides entry points for all LSST EPO
- LSST@HOME browsing, adoption, and network participation allow personalized access to portal and sharing
- Providing access to data products and science updates for content developers of planetarium shows, exhibits, and kiosks
- Professional Development Workshops for Content Developers or Classroom Instructors, online and face to face

- Citizen Science – involving non-specialists in the research process such as “alert tagging” through LSST EPO and partners
- Classroom Research Projects – middle school through undergraduate, Undergraduate Internships (REU, RET, FaST)

Advanced Student Activities

Student intern programs directly expose future potential hires to the observatory working environment. Although not formally a Broadening Participation program, the NSF Research Experience for Undergraduates (REU) has been one of the most effective tools used by AURA, as well as other qualifying institutions, in order to contribute to STEM workforce development through research-based training and education. For STScI and Gemini, which are unable to participate in the REU program, comparable active intern programs have been established.

- For NOAO North, the REU program in summer 2012 totaled 7 students, 5 of whom were women. At NOAO-S, there were 6 students, 2 of whom were female.
- At NSO, 2012 saw a class of 6 REU summer students, of whom four were female. Two REU students, one male and one female, will present poster papers on their respective projects at the January 2013 meeting of the American Astronomical Society in Long Beach, California. The NSO anticipates that another two REU students will present poster papers at the 2013 meeting of the AAS Solar Physics Division (SPD) in Bozeman, Montana. At the Anchorage SPD meeting in June 2012, one student presented a poster paper on her summer 2011 REU project.
- The NSO also actively participates in the NSF’s International Research Experience for US Graduate Students in collaboration with the Indian Institute of Astrophysics (Bengaluru). Of the four students in 2012, two were female, one of whom was also from a minority serving institution (Alabama A&M University). One of the males was from a Hispanic serving institution (California State University, Northridge).
- The NSO mentored 6 Summer Research Assistants including 3 (1 female and 1 native Hawaiian male) from the Akamai Program and 3 graduate student SRAs (1 female from the Fisk-Vanderbilt Masters-to-PhD Bridge Program)
- For Gemini, during 2012 there have been 16 interns who have 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.
- For the Space Telescope Science Institute, 21 summer interns were selected, of whom 12 were female. 7 of the 21 identified themselves as being from underrepresented groups. Additionally, 5 STScI graduate students hires for this year (3 female, 1 minority) were former summer student participants.
- Scientific and HR staff from STScI continue to work with the JHU Physics and Astronomy Diversity Group focusing on issues of diversity and equity for postdoctoral research fellows at JHU. STScI and JHU jointly sponsored a day-long event, talk and town hall on unconscious bias.

AURA Centers have also reached out in other ways. In November, the NSO sponsored a special Akamai Technical Workshop in Maui, with 5 staff in attendance. This was intended to stimulate interest in engineering careers among alumni of the Akamai Internship Program. 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 ATST operations and on-site instrument development activities.

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. Two 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. As discussed next, it is in AURA's interest that programs such as PAARE be further refined and sustained within the NSF portfolio.

Organizational Initiatives

In 2011, the NSF proposed discontinuing the PAARE program based on decreasing demand. In 2012, the Workforce and Development Committee developed a recommendation on behalf of AURA to the NSF Portfolio Review Committee aimed at making modifications to PAARE. See http://www.aura-astronomy.org/news/2011/PAARE_comment_to_PR.pdf.

In modifying PAARE, AURA suggested consideration of the following alternative features:

1) Broaden to include other NSF directorates

An advantage of this may be funding stability and/or increases for the program budget.

2) Broaden to include other Astro related disciplines (astro-instrumentation, etc)

Although the current PAARE program accommodates other disciplines, it may be necessary to specifically encourage more proposals to include astro-informatics, astro-instrumentation, and astro-computation as part of their program.

3) Modify focus to also include mentor (i.e. MSI proposer) research strengthening

In order for programs to be successful, it may be helpful to include more of an opportunity for MSI proposers to strengthen their own research by proposing for small pilot grants that enable PIs to better establish partnerships with non-MSI institutions.

4) Modify to more strongly encourage institutional partner interaction

Many MSIs lack the administrative infrastructure to support large (or small) grants. Allowing non-MSI institutions to act as the PI for proposals with strong requirements for funding to go directly to the partner MSI in order to build up research capacity may help with this problem.

5) Ideas to more effectively reach target audience for applications

Suggestions above (3, 4) may help with reaching MSI audiences since non-MSI research institutions may have more resources for identifying/putting together NSF proposals.

6) Funding of many smaller proposals versus full funding of a few

The NSF should make sure that there is at least the opportunity for large excellent programs to receive funding. It would be counter-productive to dilute a potentially good program to where it is unable to accomplish anything.

7) PAARE could be based on Partnerships for Research and Education in Materials (PREM)

One analog, PREM, has had good success over the years because MSIs tend to have active engineering departments. However, very few MSIs have astronomy departments, and it is difficult for them to make connections to institutions with astronomy departments. Helping to facilitate the beginnings of these relationships through the suggestions above (3, 4) could help improve the effectiveness of PAARE or a similar program.

8) Modifying the time when proposal calls are placed

Based on the PREM analog, it may also be more productive to issue calls every other year, rather than each year.

In response, recommendation 7.5 of the Portfolio Review stated:

AST should broaden and sustain or increase funding for the Partnerships in Astronomy & Astrophysics Research and Education (PAARE) program: (1) to allow proposals to be led by any institution that can present a compelling plan for increasing minority participation, with strong preference for minority-serving institutions (MSIs), and (2) to develop a mechanism for funding small grants for exploratory projects that initiate Programs between MSIs, community colleges, and other research institutions.

Another valuable initiative continued in 2012 was the re-issuance of the AURA Climate Survey, initially done in 2009. Since that time, all AURA Centers have implemented actions specific to their organization to address any improvements or actions suggested in that survey. AURA intends to follow up on the 2012 survey in a similar fashion.

Community Engagement

AURA has continued its commitment to establish a greater presence at national meetings associated with underrepresented minorities. For 2011, AURA participation included:

- In June 2012 Dr. Dara Norman organized an AAS Career session entitled, “Straight Talk About an Astronomical Career: A Professional Development Session” in Anchorage, Alaska. David Silva participated in the discussion.
- Dr. Norman co-authored an invited testimony for an NRC conference on Women of Color in STEM.
- Dr. Norman represented the AAS at the Association of Women in Science’s Advancing Ways of Awarding Recognition in Disciplinary Societies (AWARDS) workshop. The workshop focused on strategies to eliminate gender disparities in rewards and recognition for women in STEM societies.
- LSST has undertaken a number of outreach activities unique to its pre-construction status. LSST staff presented a panel discussion about LSST at the International Planetarium Society Conference in Baton Rouge, LA, July 22 – 26, 2012. Of the approximately 750 individuals who attended the week-long conference, about 45% were from foreign countries. Roughly 30 people came to the LSST session; they represented planetaria large and small as well as companies that provide hardware and software to the planetarium community. After a general description of LSST, the group discussed the use of data in digital planetaria, and the LSST representatives distributed a questionnaire to capture ideas from the audience.
- Ten LSST project members attended an April 1 – 4, 2012 workshop in Brazil that explored synergies between the project and the Brazilian astronomy community. Presentations delivered by project members covered science, simulations, project status, and technical plans. All LSST presentations at the workshop can be viewed at <https://www.lsstcorp.org/brazil/>.
- The STScI OPO group maintained partnerships with local schools in 2012 and provided ongoing internship opportunities for high school students. OPO’s high school internship program, now in its fourth year, has hosted four high school students. Three of the students are repeat participants in the program - with one now a college student who mentors the younger students. This program serves as an avenue to engage students in STEM at earlier grades and is an entry point for additional opportunities such as STScI’s High School Research Mentor Program and Space Astronomy Summer Program.
- STScI instituted a pilot program for high school students in 2012. Area high school students could apply for a summer experience and an ongoing internship in the fall of 2012. STScI currently has two students, 1 male, 1 female, both minorities, from local high schools.
- STScI continued the HST Summer STEM Internship program in partnership with the Maryland Space Grant Consortium. This internship program provides an opportunity for an underrepresented undergraduate student to participate in STEM activities related to HST computer science applications.
- STScI continues to develop strong ongoing partnerships with area colleges, universities and city/county organizations in an effort to generate a pipeline of interns, particularly in science, engineering, and outreach. Ongoing relationships exist with University of Maryland, Baltimore County (UMBC), Capitol College, Morgan State University, ITT Technical Institute, the Mayor of Baltimore’s YouthWorks Program, and My Sister’s Circle. Of the 17 additional interns who

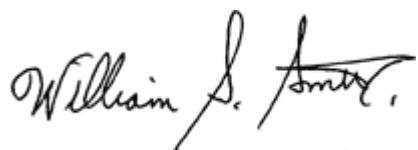
- worked, or are working, at STScI in 2011, 5 were female and 6 were from underrepresented minorities. One of its current interns (African-American female) started with STScI as a high school intern working with one of its scientists, returned as a summer student in 2011 and has remained working on a science project with our HST Mission Office Project Scientist. STScI's partnerships have also allowed it to solicit new membership for its Future of the Workplace Committee.
- STScI participated in the AAS in January, 2012 and the National Society Black Engineers/Hispanic Engineers Conference in September, 2012.

Summary

Over the past five years, AURA's focus on the workplace, and future workforce, has begun to result in the gains we anticipated. The impediments are large, however, and dramatic progress in the near term is unlikely.

- AURA demographics have slightly improved but still lag the general population of comparable R&D organizations. Some areas, however, such as women in top management, seem to lead the community.
- Our focus on ensuring a proactive recruiting program at all levels, free of unconscious bias, may lead to even greater gains.
- AURA Governance continues to decline in its diversity and greater attention will be needed to reverse these trends.
- AURA's effort to cultivate a future, more diverse, workforce has established itself as a high priority for all AURA Centers. Our engagement with students through the REU and PAARE programs, and new partnerships such as IINSPIRE, will expand our engagement with underrepresented minorities, and geographic and institutional sectors that have not had high participation rates in STEM fields.
- AURA managers have continued a proactive engagement and presence in national meetings and have participated in other opportunities for community leadership.

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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