



Association of Universities for Research in Astronomy

WORKFORCE AND DIVERSITY PROGRESS REPORT

Calendar Year 2009

Dear Colleague,

Over the past year, AURA has vastly strengthened its commitment to broadening participation, affirmative action, and a proactive development of the future workforce. This letter is intended to summarize for AURA employees and governance the actions we have taken over the past year, and to call attention to those policies and future initiatives that will help us achieve our goals. This will be the first in an ongoing series of annual reports from me.

As context, 2009 was an extremely important year for AURA in many respects. AURA completed its negotiations with the National Science Foundation for the renewal of its cooperative agreements for the operation of the National Optical Astronomy Observatory (NOAO), and the National Solar Observatory (NSO). In addition AURA submitted a proposal to the NSF for an extension of the cooperative agreement for the operation of the Gemini Observatory. This was an opportunity to examine our commitments for broadening participation across the entire range of AURA managed observatories in the same way we have for the Space Telescope Science Institute in the past. These observatories serve a wide community and employ a large workforce. We have made broadening participation a key part of AURA's overall strategic plan. We have not only laid out a proactive set of commitments for the observatories we manage, but we have also established within AURA governance, dedicated initiatives for diversity and workforce development that will be sustainable in the future.

The benefits of broadening participation in science, technology, engineering, and mathematics (STEM) are now well recognized and go far beyond AURA. Our economic strength and global leadership depend on our ability to promote the development of new knowledge, and to generate and harness scientific and technological developments for real world applications. This depends on engaging the full strength of the workforce today, and educating a new generation of skilled workers that can contribute at every level in the future.

The tools that are available to AURA include its employment base, the scientific and engineering programs carried out by its centers, the public outreach and educational programs carried out by its centers, and the makeup of its governance. AURA has developed an Action Plan for Broadening Participation¹ aimed at using these tools to strengthen our role in increasing the participation of:

- *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, backgrounds, interests, and perspectives to enrich the workforce origin, and skill characteristics.
- *Future Workforce:* we will orient our outreach programs 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 STEM fields.
- *Institutions:* 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.
- *Geographic Areas:* 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 seeks to play a role in the overall effort to broaden participation. We are only at the beginning. This letter and follow-on reports in the future are intended to mark our progress and renew our commitment on an annual basis.

¹ see <http://www.aura-astronomy.org/diversity/actionplan.asp>

AURA Demographics

AURA has sought greater diversity both in the workforce of direct employees and the makeup of the collection of individuals from the community that participate in its governance. In addition, AURA has sought to diversify target audiences for its outreach and educational programs in order to improve the pool of future employment candidates.

One standard for demographic comparison for AURA's workforce is the required reporting by the Equal Employment Opportunity Commission.

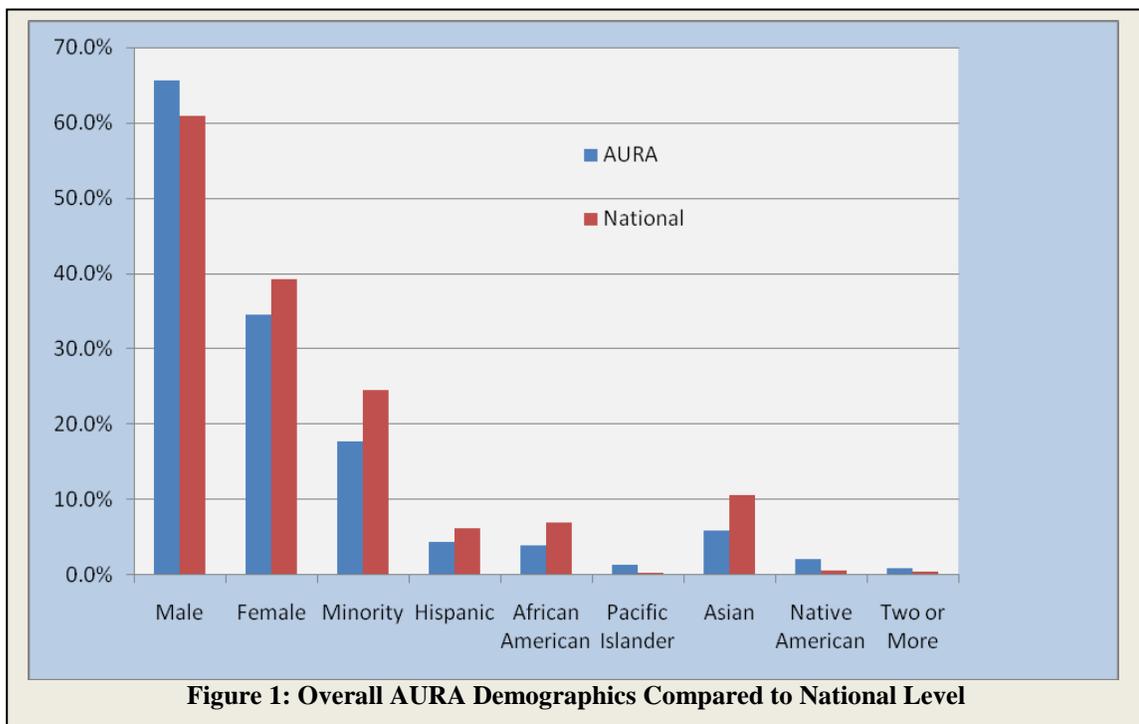


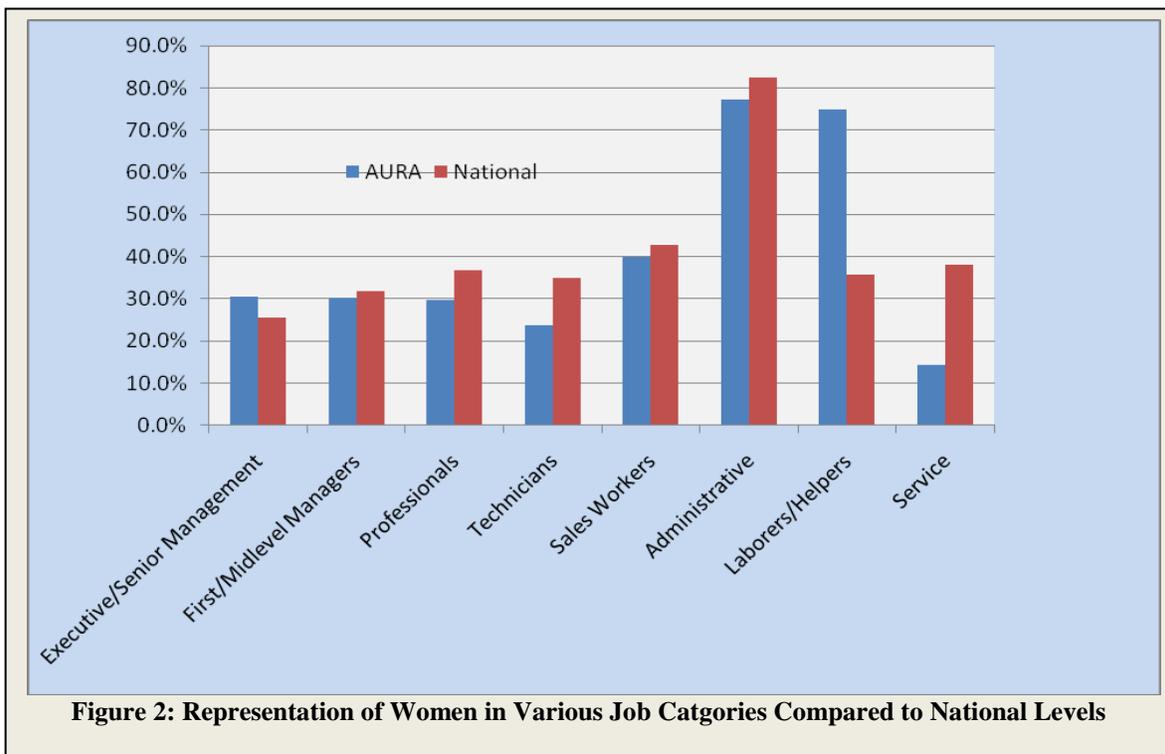
Figure 1 shows the overall demographics for the AURA US workforce for calendar year 2009 compared to the national levels for those employed in the private sector for physical, engineering, and life sciences². This shows the representation for women and minorities, and a further breakdown of specific minorities. There have been no dramatic shifts in these patterns over the past decade.

² Aggregate 54171 EEOC Statistics, <http://www.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2007/nac5/index.html>

As seen, AURA demographics, while not substantially different, do not fully reflect what should be the case. AURA has long recognized that the nature of the astronomy profession, our site locations, and other factors associated with employment at a national observatory have been impediments that need to be overcome by many astronomy organizations including AURA³.

In addition to this EEOC based metric, AURA employs 169 Chilean workers who greatly enrich AURA’s multi-cultural makeup. AURA also employs a wide variety of other non US nationals at all of its sites. They are fully integrated into the workforce and occupy all employment levels.

Figure 2 shows AURA’s employment of women in various EEOC defined job categories compared to the national case. As seen AURA has exceeded the national level in one of the most important categories, senior level managers.



AURA Centers have undertaken special efforts to begin to improve the overall employment demographics appropriate to their individual hiring situations and locations.

³ Demographic distributions vary dramatically with employment fields. For example, the participation rates for women and minorities in the social sciences and humanities are 56% and 34%. For the aerospace industry, women and minorities account for 23% and 24%.

- NOAO has reported that women and minorities have accounted for 37% of staff promotions and that of 21 new staff members hired in 2009, 9 were women and 7 were minority group members⁴.
- STScI was successful in increasing the number of female astronomers from 3% of the research staff in 2005, to the current improved fraction of 13%. The number of female astronomer departures has reached an all-time low in the last three years and was reduced to zero in 2008 and 2009 due to a dedicated and collective effort to create a more open and hospitable work environment. This included addressing tolerance and cultural issues, as well as implementing a suite of family friendly policies⁵.
- For Gemini, during 2009, 37% of new hires were from underrepresented group members and Chilean staff. Gemini has also been successful in hiring and retaining female astronomers. Female scientist's representation increased from 24% of PhD science staff in 2005 to 31% in 2009. The overall retention rate of female science staff is 88% compared to 64% for male science staff, reflecting a positive working environment that values diversity at its core.⁶

Achieving an ethnically diverse workforce at AURA is challenged by the pool at applicants available. In 2008, 248 PhD's in astronomy were awarded, 25% going to foreign nationals. Of the remaining new astronomy PhD's, five (or 3%) were issued to Hispanics and there were no American Indian or African American recipients. We are also challenged by the available pool of engineers. Of the 7862 engineering PhD's in 2008, 57% went to foreign nationals. Of the remaining 2982, only 133 or 5% went to Hispanics, 111 (4%) went to African Americans and 7 (<1%) went to Native Americans⁷.

Gender diversity is also constrained by the pool. Twenty-five percent of astronomy PhD's and 22 percent of Engineering PhD were issue to women, compared with 36 percent in the STEM fields overall.

Within its governance, AURA has also sought greater diversity. AURA's standing committees are listed on the AURA website at <http://www.aura->

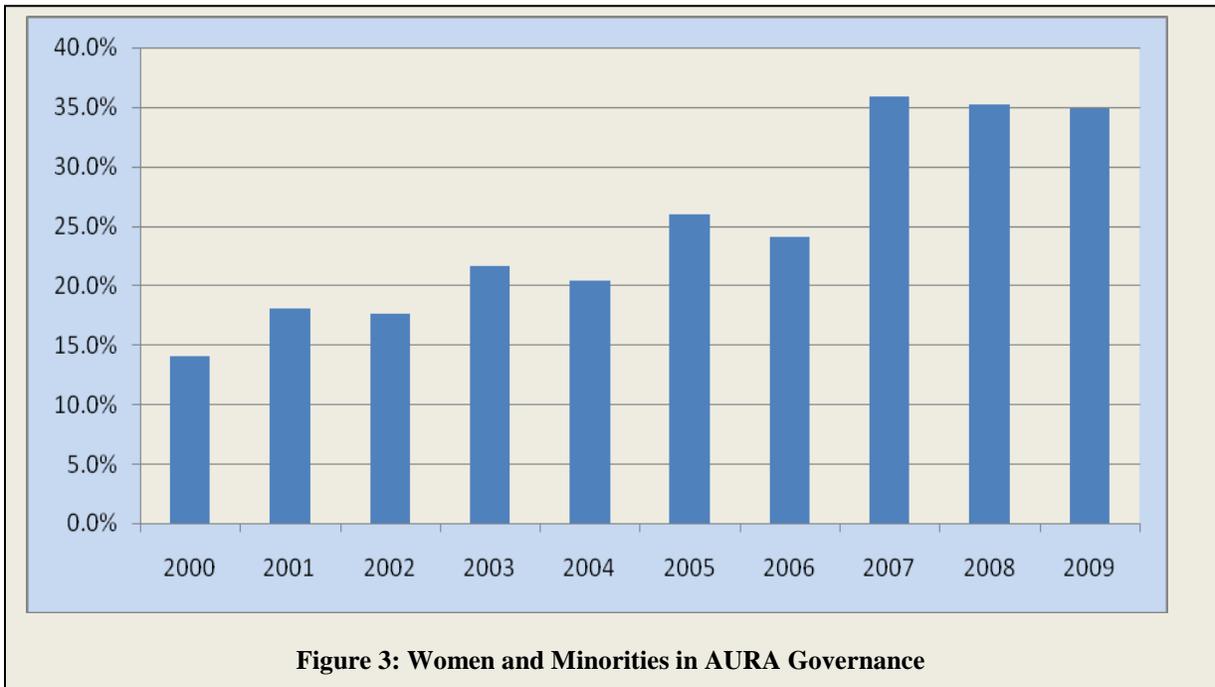
⁴ See NOAO 2009 Annual Report, <http://www.noao.edu/dir/proj-rep/ar-fy09.pdf>

⁵ See <http://www.aura-astronomy.org/diversity/documents/White%20Paper%20for%20Decadal%20Survey%20NOTA.pdf>

⁶ See Women Astronomers at Gemini: A Success Story –Presented at the 215th meeting of the American Astronomical Society, January, 2010

⁷ www.nsf.gov/statistics/nsf10309 (see tables 36, 37, and S-38)

astronomy.org/. AURA has sought to maintain at least 30% women and minorities in its governance, above what would be the pool for academic candidates. In addition to diversity goals, governance choices are sharply constrained by a variety of management, scientific, and other factors. Figure 2 shows the trend over the past decade in achieving greater percentages of women and minorities. (AURA has also sought to include individuals from a greater diversity of institutions and geographic areas which are not shown in this comparison.)



In addition to achieving numerical balances in AURA demographics, we have begun to assimilate “best practices” from our member institutions. As a part of the April 2009 Annual meeting, Member Representatives were asked to establish a dialogue with their respective institutional leads in the area of diversity and broadening participation, and to provide input to AURA. We have only begun this process and we intend to pursue this in the future and, ultimately, to partner with specific Member Institutions.

Growing a Diverse Workforce

AURA has targeted its outreach and education programs to emphasize engagement of underrepresented populations⁸. The NSF Research

⁸ A summary of outreach efforts by each center can be found at <http://www.aura-astronomy.org/diversity/outreach.asp>.

Experience for Undergraduates (REU) has been one of the most effective tools used by qualifying AURA centers. Over the past five years, REU classes at NOAO and NSO have achieved nearly 50% women and minorities. For the 2009 REU class at Kitt Peak National Observatory, six students were selected of whom two were women and two were minorities⁹.

The National Solar Observatory has also participated in the REU program and the Research Education for Teachers (RET) program. In all, a diverse group of eleven students and teachers participated in summer research opportunities at locations in Tucson and Sunspot for 2009. Six students were selected for the REU program, of which three were women and two were minority students. Two teachers were in the RET program, and three students were in the graduate Summer Research Assistantship program¹⁰.

During 2009 Gemini Observatory supported 21 internships in STEM occupations as part of its workforce pipeline development, to provide early exposure to astronomy related careers for individuals. The interns originated from local communities in Hawaii and Chile, partner countries and through specific programs, for example, The Akamai Workforce Initiative.¹¹

In 2009, the STScI Summer Program had 14 students, 7 men, 7 women and, 3 of whom were minority students. Additionally, during 2009, STScI brought in 14 of the interns through different affiliations with local universities and programs. Eight of the 14 were minorities, 10 were women. They served in positions in engineering, IT, Education and Outreach, Science and Administration. Most were involved in technical projects, whether in computer science, web application or test engineering. STScI has hired 4 of these interns into ongoing positions in budgets, testing engineering and administration. Two were African American females.

All AURA Observatories participated in the International Year of Astronomy in 2009 and took this opportunity to include underrepresented groups.

For example, as part of Gemini's IYA activities, the 2009 Journey Through The Universe program gave nearly 8000 students on the Big Island of Hawai'i the opportunity to have a lesson presented by astronomers or those

⁹ See <http://www.noao.edu/education/reu/kpnoreu2009ar.pdf>

¹⁰ See <http://www.nso.edu/general/docs/fy09qr2.pdf>

¹¹ See <http://cfao.ucolick.org/EO/internships/akamai/akamaibigisland.php>

involved in the astronomy profession.¹² IYA was part of the AstroDay activities in Hawai‘i (organized by the University of Hawai‘i) and Chile (organized by Gemini). Also in Chile was a remarkable program in which Gemini outreach staff and representatives from local universities spent a week on Rapa Nui, offering astronomy outreach programs to nearly 1/3 of the island’s inhabitants. Given the unique connection Rapa Nui has with both Chile and Hawai‘i as a cultural nexus spanning ~10,000 km, and the fact that Rapa Nui will be the site of a solar eclipse in 2011, this spectacularly successful outreach project was among the most innovative of those accomplished to date in Gemini’s overall outreach program.¹³

AURA has also made progress in establishing partnerships with institutions having large populations of under-represented minorities. In 2009 AURA collaborated with the Fisk-Vanderbilt program to co-mentor masters and PhD students at AURA centers. One PhD student is being co-mentored at STScI , and two masters students are at NSO. All three of these have transitioned to the PhD program.

AURA has also established a partnership with South Carolina State University, which works with African American students early in their undergraduate years. This partnership is funded through the NSF’s Partnerships in Astronomy and Astrophysics Research Education. The program provides summer research experience opportunities (including observing at Kitt Peak) with the goal of encouraging students to go on to graduate school. In 2009, NOAO took on one such summer student.

Organizational Initiatives

AURA committed to begin several important organizational initiatives including the appointment of dedicated Diversity Advocates within each Center, the establishment of a Workforce and Diversity Committee, and AURA wide actions to identify and exchange best practices.

In order to coordinate resources and activities AURA wide, a new website, Commitment to Diversity, was established at <http://www.aura-astronomy.org/diversity/>. This site includes best practices, ongoing

¹² See <http://www.gemini.edu/files/pio/jttu/2009/Journey2009.pdf>

¹³ See <http://www.gemini.edu/node/11321>

activities, and important new initiatives. We have upgraded the overall AURA website to make it accessible to the visually impaired¹⁴.

The role of the Diversity Advocates, shown on the website, is key to nearly all other actions AURA envisions in the future. The Diversity Advocates report to each Center Director and coordinate Human Resources and outreach and educational activities that focus on diversity and workforce development. Some responsibilities include:

- Work with HR, EPO, and management
- Serve as Members of the Workforce and Diversity Committee
- Monitor and participate in hiring processes; evaluate having a presence on hiring committees
- Engage in all aspects of diversity -Promotion & Tenure, policies, outreach, recruitment, committees, etc.
- Bring together groups of like interest, across and within Centers, among member institutions, etc.
- Look at ways to leverage expertise, resources and best practices across Centers, where appropriate
- In partnership with other Center staff, represent the Centers in various venues for broadening participation
- Work on AURA wide initiatives
- Identify a standard set of metrics
- Share information about diversity policies, meetings, etc. between Centers through a collaborative WIKI and periodic meetings
- Work with Centers on clarifying and implementing preliminary goals identified in the April, 2009 AURA diversity workshop

Diversity Advocates fill a crucial role in focusing on diversity and broadening participation issues. They are not intended to replace existing expertise nor the functional responsibilities of HR or public outreach.

In August, 2009 AURA held the first meeting of the Workforce and Diversity Committee¹⁵. The Committee discussed the need to establish internship programs that might engage minority students in engineering

¹⁴ AURA is in compliance with the “Web Content Accessibility Guidelines (WCAG) 2.0” developed by the Web Accessibility Initiative (WAI). The WAI was established by the World Wide Web Consortium, an international community that develops standards to ensure the long-term growth of the Web.

¹⁵ The charter and membership of the Committee are found at <http://www.aura-astronomy.org/g/ag.asp?gid=112>.

fields at AURA Centers. AURA Centers will develop an inventory of current mentoring commitments and future capacity in order to ascertain our ability to increase the number of minority PhDs. The Committee intends to play an active role in identifying and recommending individuals from underrepresented groups, institutions, and geographic areas for potential slots on AURA governance and ad hoc committees.

The Committee also reviewed an initiative in the Spring of 2009 by the Diversity Advocates to conduct an AURA wide workplace climate survey at all AURA Centers¹⁶. One key issue that emerged from this survey was to ensure that AURA policies¹⁷, including those addressing workplace issues, are more readily accessible to all employees. Each Center is following through to ensure that this is accomplished.

Finally, in 2009, AURA successfully implemented an AURA wide integrated human resources program based on the Ultipro software system. This was the result of increased coordination and communication between the human resource departments of AURA centers. Ultipro will have a profound effect on AURA's recruiting, hiring and training practices as well as its ability to document progress. Providing a tool for improving workforce diversity was a major driving factor in acquiring Ultipro.

Policy Development

At the outset of AURA's renewed commitment to broadening participation, it was recognized that AURA needed to be a leader in airing important policy issues, fostering the exchange of ideas and best practices, and keeping broadening participation at the forefront of any discussion of priorities within the astronomy profession.

In 2009, AURA staff submitted a number of focused white papers to the Astro 2010 Decadal Survey State of the Profession Panel¹⁸. These address the unique issues affecting the number of underrepresented minorities in astronomy through the K-12, undergraduate, graduate, and post doctoral educational phases.

¹⁶ Top level results from that survey can be found at <http://www.aura-astronomy.org/diversity/documents/Climate%20Survey%20High%20Level.pdf>.

¹⁷ See <http://www.aura-astronomy.org/a/pp.asp>

¹⁸ Some of these can be found at <http://www.aura-astronomy.org/diversity/resources.asp>.

In April, 2009 AURA held a major diversity workshop in Tucson involving a large segment of AURA staff and governance, funding agencies, and groups involved in promoting underrepresented minorities¹⁹.

AURA has also made a commitment to establish a greater presence at other national meetings associated with underrepresented minorities. For 2009, AURA participated in:

- The Joint Meeting of the National Society of Black Physicists and the National Society of Hispanic Physicists, February, Nashville, Tennessee
- Women in Astronomy and Space Science 2009, October, College Park, Maryland
- Society of Women Engineers Oct 15-17, 2009 Long Beach, CA
- Women of Color in STEM Conference, October 31, 2009, Dallas.
- Society of Hispanic Professional Engineers Conference, October, Washington D.C²⁰.

Tracking Our Progress

In order to maintain awareness and focus on diversity and broadening participation issues, AURA has made the following commitments:

- *We will include a discussion of progress on this plan in the Annual Reports and Program Plans submitted by AURA to the NSF and NASA. For NOAO, appendix H of the 2009 Annual Report²¹ includes a specific discussion of its commitments to Broadening Participation. For STScI, NSO and Gemini, past Annual Reports have included a discussion of broadening participation and the FY 2009 reports will include specific results.*
- *AURA's management and oversight committees will review the progress of their respective observatories. These will also be reported to the AURA Board. In 2009, each Management Council included a specific discussion of broadening participation.*
- *We will include as part of the charters for our Visiting Committees a review of education and public outreach activities and staff hiring*

¹⁹ A summary of papers submitted are at <http://database.aura-astronomy.org/diversityworkshop/>

²⁰ Also see AURA summary at <http://www.aura-astronomy.org/diversity/documents/Report-SHPEConference.pdf>

²¹ http://www.noao.edu/dir/program_plan/program_plan_fy10.pdf

practices at these centers. The Visiting Committees have the charge to examine all aspects of this issue including the effectiveness of AURA's oversight and management, in addition to the programs themselves. In 2009, Visiting Committees for all AURA Centers addressed diversity issues and related outreach and education initiatives. Management Councils as well as the Committee on Workforce and Diversity will review relevant recommendations.

In the future, AURA will remain open to new ideas and recommended improvements and will establish and clarify pertinent metrics. We intend to identify practices and policies that work and have an impact, and allocate our resources in those directions.

I look forward to detailing our progress in future annual reports.

A handwritten signature in black ink that reads "William S. Smith". The signature is written in a cursive style with a large, prominent 'S' and a long, sweeping underline.

Dr. William S. Smith
President
Association of Universities for Research in Astronomy