



ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY

**AURA Strategic Action Plan for Broadening Participation
July 2009**

STATEMENT OF COMMITMENT

As a leader in the astronomical community, AURA believes that it bears a responsibility to that community to develop and support outreach and educational programs which will not only advance our organizational commitment to diversity but broaden participation and encourage the advancement of diversity throughout the astronomical scientific workforce.

AURA is deeply committed to the human resources that support our mission to advance astronomy and related sciences and is deeply invested in continually developing and improving its policies and practices for the purpose of providing a welcoming and fruitful work environment for all employees. AURA believes that a diverse workforce, particularly one that includes women and individuals from underrepresented minority and the disabled groups, contributes best to the achievement of excellence in both our organization and the scientific community as a whole.

All AURA staff bear responsibility for developing and fostering a diverse and inclusive work place. For upper-level employees, this responsibility shall be specifically identified in their individual job descriptions, and their success in meeting this responsibility shall be specifically evaluated in their performance evaluations.

AURA's recruiting and hiring practices are designed to attract a broadly diverse pool of candidates including underrepresented applicants. When a vacancy occurs, AURA will hire the most qualified person from among the fully qualified applicants meeting AURA goals and clearly defined program needs while endeavoring to develop and maintain a diverse work force where women, underrepresented minority and disabled staff are proportionately represented.

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This document lays out AURA's strategic action plan for broadening participation in AURA's activities. A successful implementation will have effects beyond AURA, and will serve to strengthen the nation's astronomical enterprise in the future.

CORE PRINCIPLES FOR BROADENING PARTICIPATION

- **ESTABLISH A CULTURE OF EXCELLENCE:** Ensure a visible commitment from top management; continually improve our ability to identify opportunities; invest resources optimally; motivate, recognize and reward accomplishment; identify and remove impediments that prevent us from reaching "demographic equilibrium"
- **NURTURE OUR WORKPLACE CLIMATE:** Assure that all employees are welcome, respected, supported, heard, and acknowledged; seek and value contributions from all sources while reaching out especially to groups that have been underrepresented
- **DIVERSIFY OUR WORKFORCE:** Recruit and hire highly qualified professional staff members who reflect the diversity of our community
- **GROW A FUTURE WORKFORCE:** Work with partners to extend the reach of STEM education and workforce programs; use our "tools" to disseminate the skills and knowledge needed to flourish in a global knowledge economy.

TOP LEVEL GOAL

The top level goal of this strategic action plan is to strengthen AURA's 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 well-qualified individuals and groups who bring varied human characteristics, origins, backgrounds, interests, skill characteristics, and perspectives to enrich the workforce.
- *Future workforce:* we will orient our outreach programs and partnerships to target underrepresented minorities, women, and the disabled for the purpose of increasing the flow of undergraduates, graduates and post-docs into the fields of astronomy and related technology.

- *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.

OVERALL STRATEGY

- Achieve broad participation in AURA’s community based governance itself and take advantage of the best that our member institutions and individuals involved in our activities can offer. This is essential to achieve a top level emphasis and commitment and more effectively carry out the management and oversight activities of our plan.
- Aim to increase participation in the ranks of AURA employees.
- Focus on identifying and better engaging institutions and geographic areas that have not participated to the extent possible in the field of astronomy in general, and in particular not fully participated in the heart of AURA’s mission and that of our observatories, namely the scientific and technical programs carried out by our observatories including observing time, engineering and development efforts, and scientific initiatives.
- Perhaps most importantly, aim to engage the students at all levels who will constitute our future workforce.

NATIONAL CONTEXT

The National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF) have a long history of seeking broader participation in their programs. The NSF’s mission states:

“NSF’s goal is to expand the numbers and diversity of individuals – women and men, underrepresented minorities, and person with disabilities – engaged in the science and engineering enterprise through increased participation of underrepresented groups and institutions in all NSF programs and activities.”

NASA’s Policy on diversity states:

“To design the most effective systems, NASA must have a diversity of views, ideas and perspectives. This requires taking into account all the possible sets of training and experience that come from people of different backgrounds and life experiences. It is the widest diversity of viewpoints and considerations that go into making good technical solutions for NASA.”

The American Competitiveness Initiative (ACI) adds a new context and urgency to this issue. America’s economic strength and global leadership depend in large measure on our Nation’s ability to generate and harness the latest in scientific and technological developments and to apply these developments to real world applications. Achieving the vision of ACI depends on engaging the full strength of the U.S. workforce today, and on educating a new generation of skilled workers equipped to be creative and innovative, that can contribute at every level in the future. AURA’s strategic action plan and those of its funding agencies will contribute to this

vision in preparing a diverse, globally engaged science, technology, engineering, and mathematics (STEM) workforce.

PROFESSIONAL CONTEXT

Despite its natural appeal, astronomy is among the least representative of the sciences in terms of ethnic makeup of its practitioners, the advancement of women, and the engagement of the full spectrum of institutions.

Women astronomers constitute the most accessible pool of current talent. Yet, even here the “leaky pipeline” is clearly evident from the statistics gathered by the American Institute of Physics.

Underrepresented minorities make up 25% of the US population, yet represent less than 2-3% of the professional astronomers. Of the 650 professional astronomers at PhD granting institutions in the US, 7 are African Americans, 9 are Hispanic, and only one is Native American¹. The American Astronomical Society (AAS) Committee on the Status of Minorities in Astronomy lists only 29 minority members in the AAS².

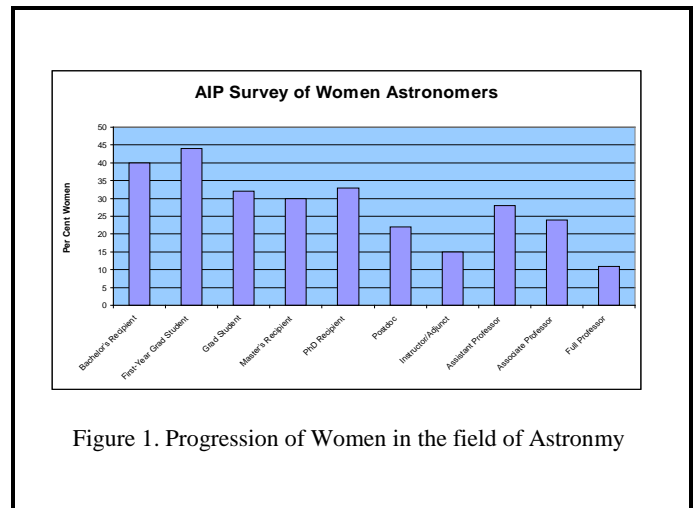


Figure 1. Progression of Women in the field of Astronomy

The NSF has committed itself to achieving a deeper understanding of the underlying trends that have been so clearly evident. Most of the following features of the national problem reflect the challenges to AURA and to the field of astronomy.

1. The percentage of tenure-track faculty from underrepresented minority groups at post-secondary institutions is significantly lower than the percentage of students from underrepresented minority groups at these institutions.
2. Low numbers of minority science and engineering faculty impede the recruitment and retention of underrepresented minority students in science and engineering programs.
3. The number of underrepresented minority students who pursue graduate study in science and engineering fields lags significantly behind undergraduate minority participation.
4. Encouraging and facilitating the movement of students from undergraduate to graduate and post-doctorate levels will expand the pool of minority science and engineering faculty candidates.
5. Best practices have been identified for programs that successfully broaden participation at the undergraduate level. Hands-on research experience at the undergraduate level has a positive influence on decisions to pursue a graduate degree in science and engineering.

¹ “Building Bridges to Diversity”, K. Stassun, Mercury, June 2005.

² <http://www.vanderbilt.edu/csma/members.htm>

AURA's unique commitment to promoting public astronomy, its relatively large employment base, and the deep roots it has in the community through its broad-based governance provide ample opportunities to develop deeper understanding of these issues and to address them head on. AURA has previous experience addressing workplace and climate issues that can impose barriers both to our effective recruitment and retention and to our need to engage underrepresented groups and ensure broad geographic and institutional participation in our activities.

AURA's success will be based on understanding these problems and capitalizing on successes we can identify.

BROADENING PARTICIPATION FOUNDATION

AURA has had a commitment to broadening participation within its organization since its establishment over 50 years ago. This has been a fundamental part of making the public astronomy enterprise successful, and serves as a foundation for our future actions.

AURA's corporate policies: <http://www.aura-astronomy.org/a/pp/sb.asp> express a strong emphasis on seeking diversity, affirmative action, and reaching out to a broad spectrum of institutions.

AURA's corporate strategic plan, which may be found at: http://www.aura-astronomy.org/nv/AURA_Strategic_Plan.pdf, sets as high strategic priorities:

- Education and public outreach
- Diversity of the AURA workforce
- Broader benefits to society that accrue from accomplishing our mission

AURA has had many successes in achieving these goals, yet much more can be done.

Women in the Workforce

AURA has previously paid special attention to the issue of women astronomers in the workforce. At the outset of the current (2002) cooperative agreement, AURA's attention to the diversity issue was focused by a special AURA-chartered external review carried out at the Space Telescope Science Institute (STScI) aimed at the status of women scientists at STScI. (See <http://www.aura-astronomy.org/nv/nuresult.asp?nuid=52>)

In addition to this focus on scientific professionals related to AURA's core science mission, clearly the goals of broadening participation require a deep commitment at all levels and functional areas within AURA including non-scientific professionals and other skill categories. Figure 2 shows the AURA workforce broadly divided into the research and non-research areas.

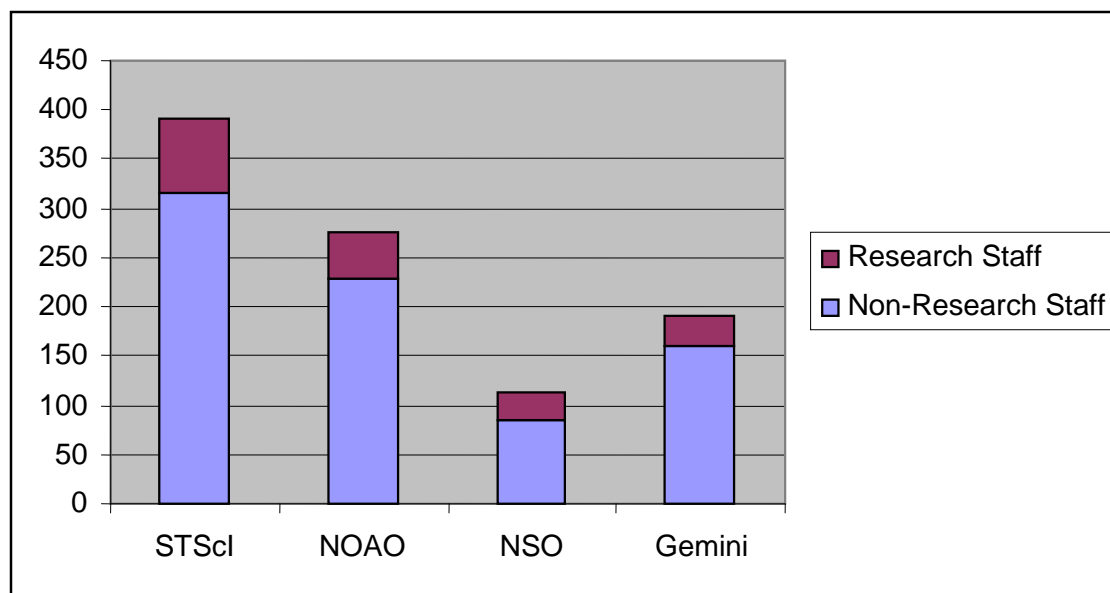


Figure 2: Size of AURA Workforce

Non research staff constitutes an appreciable employment pool that can contribute better to the broadening participation goals for employment of women and underrepresented groups.

Underrepresented Groups in the Workforce

AURA's success in diversifying its workforce for other underrepresented groups has been uneven and we have been affected by many of the difficulties faced by other organizations in physics and astronomy. Our emphasis has been on increasing the population of minorities and the disabled in the workforce pool through education and outreach so that future recruitments can be more effective.

Institutions and Geographic Areas

Insofar as broadening institutional and regional involvement in the field of astronomy, clear statistics are not readily available, however there is strong evidence that the largest institutions in the most populous regions of the country have been the most directly engaged.

Over the past five years, AURA has specifically attempted to include smaller colleges in populating its governance committees such as the Observatory Council which oversees NOAO. Members of the Observatory Council have included faculty from institutions such as Williams College and Middlebury College. This has also been reflected in user committees and various ad hoc committees.

AURA's Workplace Climate

A top level goal for AURA has been to remove impediments to recruitment and retention that might exist as a result of workplace climate factors. In spring 2009 AURA conducted an organization wide survey to elucidate some of these climate factors at a more detailed level. The results of this climate survey will be used to evaluate existing policy and practices and guide the development of future policy and practices. AURA will conduct future climate surveys to measure its progress in these areas.

AURA's Governance

The following actions were taken over the past year:

- Workforce and Diversity Committee: As a part of the Board meeting held September 24-25, 2008, AURA established a permanent Workforce and Diversity Committee as a subcommittee of the Board made up of experts in diversity and education. In April 2009, the Member Representatives of AURA elected committee members from a list of individuals who have demonstrated experience and a commitment to broadening participation. This committee will meet twice per year alternating among the AURA observatory locations and will review and examine:
 - AURA governance opportunities for greater engagement of individuals, institutions and geographic areas that are underrepresented; we envision that the Committee can identify and make recommendations for use by the AURA Membership Committee and Nominating Committee that act on behalf of the Member Representatives.
 - AURA level policies and observatory level policies as they pertain to equal employment opportunity and workforce development.
 - observatory workforce demographics including the annual Equal Employment Opportunity Commission submissions.
 - outcomes of climate surveys, effectiveness of mentoring programs within the AURA Centers, and other metrics of workplace culture.
 - observatory education and outreach initiatives aimed at developing a broadly representative future workforce.

The AURA Board will look to this Committee as a prime source of guidance for a number of other initiatives. Examples of some of the initiatives we envision include:

- Additional bridge programs (of the type exemplified by the Fisk-Vanderbilt program³) to include women's colleges.
- Town Hall or field visits by Observatory staff to geographic areas which have low participation rates in observatory programs.
- Workshops to elucidate some of the underlying issues in increasing participation (such as the very successful 2003 Pasadena workshop on women in astronomy and its 2009 College Park successor).

³ See <http://www.vanderbilt.edu/gradschool/bridge/index.htm>

- Diversity Advocate: AURA has established at each of its managed centers a Diversity Advocate reporting to the Director. This person will work with both Human Relations and outreach and educational activities to focus on workforce development. Elements of the job description for the position of Diversity Advocate include:
 - Report to Center Director.
 - Work with Center HR, EPO, and management to ensure that top level goals relating to broadening participation are achieved.
 - Serve as member of the Workforce and Diversity Committee.
 - Monitor/participate in hiring processes; evaluate having a presence on hiring committees.
 - Engage in all aspects of diversifying: Promotion & Tenure process, 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.
 - Contribute to AURA-wide initiatives.
 - Help identify a standard set of metrics.
 - Share information about diversity policies, meetings, etc. between Centers through a collaborative WIKI and periodic meetings.

The Diversity Advocate will not replace existing expertise or act in place of HR on individual issues.

TOOLS AND ACTIONS

Tools and Opportunities

Figure 3 illustrates where AURA can contribute most effectively in broadening participation by individuals, institutions, and geographic areas. Our “tools” include our community based governance, our education and outreach activities, the scientific and technical programs we carry out, and the workforce itself.

	AURA Governance	Education Outreach	Observatory Programs	AURA Workforce
Individuals	★	★		★
Institutions	★	★	★	★
Geographic Areas	★	★	★	

Figure 3: Areas Where AURA Can Contribute

AURA Governance Level Specific Actions: AURA Governance provides an opportunity to contribute to all three areas for broadening participation. Although AURA’s institutional membership criteria require AURA institutions to be PhD generating academic institutions, many opportunities exist in other oversight and governance areas which have a more direct impact on the management of our observatories. We will review these areas of AURA Governance on an annual basis to examine ways to increase inclusion of underrepresented groups in governance activities.

AURA Workforce and Diversity Committee: AURA will work with the Workforce and Diversity Committee to define a set of actions that can be reported to the NSF on an annual basis. Key among these will be to establish a clear set of metrics for the effectiveness of our internal recruitment programs, participation within AURA level and observatory level governance (e.g. oversight councils, ad hoc committees, time allocation committees, etc.), and the success of our educational activities in reaching out to underrepresented groups.

AURA’s Current and Future Workforce: While AURA’s previous attention to the diversity of our workforce and development of the future workforce gives us a good foundation, much remains to be done and there are many opportunities for engagement. The pool of women scientists has been growing and AURA has capitalized on this, yet it has not grown enough. In addition the pool of minority and disabled scientists is still inadequate and underrepresented within AURA. AURA will be more proactively engaged in order to increase opportunities to foster student involvement, particularly from smaller institutions.

AURA Interface with Historically Underrepresented Groups, Institutions and Geographic Areas: AURA will establish an ongoing presence at national professional society meetings of Black and Hispanic groups. This will be aimed at achieving a closer engagement for informational

purposes, and also for recruitment purposes. AURA observatories themselves will also identify opportunities to visit smaller institutions and institutions in geographic areas that are not currently involved in our observatory programs. Such direct engagement may provide a clearer avenue for their participation.

Progress and Accountability

AURA must bring a high level of visibility to broadening our participation. We have put the following requirements and controls in place:

- 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.
- AURA's management and oversight committees will review the progress of their respective observatories. These will also be reported to the AURA Board.
- We will include as part of the charters for our Visiting Committees a review of education and public outreach activities and staff hiring 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.

The AURA President will issue an annual President's Workforce and Diversity Letter to all staff to emphasize our top level commitment, beginning in December 2009. The letter will serve to augment the reports provided above and will include not only our actions pursuant to affirmative action and other mandates, but also those efforts we are undertaking specific to the program initiatives in this Strategic Action Plan. This will also invite feedback from employees through the Diversity Advocates at the Centers.

SHORT AND LONG TERM GOALS

As a part of the AURA Annual Meeting in April 2009, AURA held a dedicated workshop to develop goals for inspiring and advancing underrepresented communities to pursue STEM education and careers and for diversifying the AURA workforce. Some preliminary goals as of July, 2009 follow and will serve as a framework for shaping our current policies, programs, and initiatives. We expect some changes in the goals as we gain experience and adapt to new information and opportunities, and our programs develop and mature.

Lexicon

STEM Science Technology Engineering Mathematics

NSBP National Society of Black Physicists

NSHP National Society of Hispanic Physicists

SACNAS Society for the Advancement of Chicanos and Native Americans in Science

AISES American Indian Science and Engineering Society

PAARE Partnerships in Astronomy and Astrophysics Research and Education (NSF)

REU Research Experiences for Undergraduates (NSF)

RET Research Experiences for Teachers (NSF)

NSF National Science Foundation

AURA Wide Goals

Short term

1. Align AURA, Centers, governing bodies and member reps in the pursuit of these objectives.
2. Articulate clear and updated policies on diversity and climate throughout organization.
3. Gather best practices information from our member institutions.
4. Establish recruitment best practices across AURA (the new software Ultipro will help track the process uniformly among centers).
5. Identify and evaluate initiatives and programs for broadening participation that may require outside resources.

Long term

1. In coordination with Diversity Advocates and Human Resources, develop AURA wide training programs and identify future resource needs.
2. Serve as a centralized clearinghouse for information and resources and facilitate cross-AURA communication.

Gemini Goals

Short Term

1. Outline our recruiting strategy for broadening participation.
2. Establish a retention program that reduces the risks of all employees from leaving Gemini.
3. Develop a pipeline of African American applicants:
 - Participate in job fairs and specific meetings/conferences, e.g., attend National Society of Black Physicists, National Society of Black Engineers Annual conferences and present at least one of these events.
 - Establish recruiting contacts at specific historically minority institutions.
4. Increase female participation in Engineering:
 - Build a relationship with the Society of Women Engineers and establish a broader recruiting network and pipeline.
5. Review current intern programs and consider starting a single coordinated program within Gemini.

Long term

1. Mentoring – consider the development of a formal program for our scientists and engineers to help them succeed in their careers and identify opportunities to extend a mentorship program to high school or college students in Hilo and La Serena.
2. Building Community – Bring together Engineers for professional stimulation and continue the development of existing Science professional activities. Consider activities such as lectures and the development of links within our engineering communities, involving other observatories or faculty from La Serena & University of Hawaii and Hawaii Community College.
3. Developing a Path – Continue to participate in our communities to reach out to students to excite them about astronomy and develop opportunities for Engineering and mentoring facets to be included. Extend our current activities to develop further engineering outreach activities through, for example, greater involvement in Astronomy events in the community. Identify Scientist and Engineer role models from under-represented groups within Gemini to participate in meetings and events.
4. Culture and environment – Create a culture and environment at Gemini that people from underrepresented groups will feel comfortable and embedded within. Implement a retention program that considers the drivers of employee retention including, effective recruiting, fair and rewards based compensation, employee induction and socialization, employee engagement, employee development through mentoring and job rotation, manager development, flexible menus of benefits, and flexible/alternative working arrangements. Measure attitudes towards the culture and environment through employee surveys.

STScI Goals

Short term

1. Continue utilizing the Future of the Workplace Committee as a resource to identify diversity issues, requirements, metrics and objectives for STScI.
2. Continue training and oversight of recruitment processes and committees for professional scientific, technical, engineering and administrative position recruitments to enhance women and minority composition of the applicant pools and to ensure that shortlists for positions generally reflect the qualified applicant pool.
3. Explore establishing a colloquia series targeting speakers from under-represented groups, or in the alternative, encourage broader participation in speaker selection for existing scientific and technical colloquia series.
4. Integrate and coordinate Institute diversity initiatives and activities potentially by organizing an oversight committee composed of representatives from different organizational units, science staff, outreach staff and human resources.
5. Create 2-3 new partnerships for sourcing science and engineering talent.

Long Term

1. Leverage impact of Institute activities by integrating with AURA and other Center objectives and programs.
2. Explore partnership opportunities with local universities, colleges, and other educational organizations to enhance and preserve pipeline resources for STEM careers and to retain these resources in STEM careers in the Baltimore Washington Metropolitan area.
3. Work with area educational institutions, particularly minority serving institutions to further education and career opportunities for science and engineering students.

NOAO Goals

Short term

1. Review the process for Promotion and Tenure and ensure that explanations of the promotion and tenure process are clearly and unambiguously presented to staff.
2. Review family friendly policies, particularly maternity/paternity policy and develop possible alternatives/modifications, including the impacts of Chilean law.
3. Address NOAO specific issues brought up in the Climate survey (e.g. management communication, and performance rewards).
4. Establish a presence at annual meetings of minority academic and engineering societies (SHPE, NSBE, NSB/HP, AISES) in order to advertise opportunities and recruit students.
5. Continue outreach to schools and programs in southern Arizona and Region de Coquimbo (Chile) that serve groups whose representation in science and engineering is less than their representation in the general population, funding permitting.

Long term

1. Address NOAO specific issues brought up in the Climate survey.
2. Explore, along with the Head of the Office of Science, a possible pre-doctoral program.
3. Establish horizontal partnerships with Minority Serving Institutions to accomplish scientific and technical/engineering goals.

NSO Goals

Short term

1. Expand recruitment efforts of underrepresented groups through broader advertising venues for NSO job opportunities.
2. Participate in STEM-related society meetings, either national or regional, serving underrepresented communities such as NSBP, NSHP, SACNAS and AISES.
3. Add a non-tenured scientific staff member from an underrepresented group to the NSO Scientific Personnel Committee.
4. Continue PAARE student participation in the NSO as funded by the Fisk/Vanderbilt PAARE proposal. Expand this beyond the scientific staff to include our engineering and technical staff as mentors.
5. Identify more mentors among the engineering and technical staff in addition to the scientific staff.

Long term

1. Increase the number of underrepresented students in the NSO REU program, ideally, with a supplement in our REU funding.
2. Expand the RET program effort by targeting teachers at minority-serving institutions, including getting funding for more RETs.
3. Increase the number of underrepresented minorities on the scientific and/or engineering/technical staff during the next 3 to 5 years.
4. Obtain student internships for engineering and computing at the NSO.