

## SPECTRUM



*A report on underrepresented minorities in astronomy*

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*by Charles McGruder, Western Kentucky University,  
Hakeem Oluseyi, Florida Institute of Technology,  
Lawrence Norris, National Society of Black Physicists,  
Pius Okeke, University of Nigeria Nsukka*



*The first executive committee of the AfAS (from right): Pius Okeke, President; Hakeem Oluseyi, Immediate Past President; Dr. Jacob Ashong, Treasurer; Ms. Susan Murbana, Education & Outreach Officer. Not Pictured: Ray Maartens, Executive Secretary.*

**T**he formation of the African Astronomical Society (AfAS) is the culmination of several years of thought on how professional astronomers in Africa can organize to advance the fundamental science and the institutions that support science, to cultivate the public interests in the science, and as a group become more engaged in the global astronomy community. As a result of a col-

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*by Dara Norman, National Optical Astronomy Observatory*

**F**or a number of years now, the NSF has made broadening participation a top priority in many aspects of its mission (see [nsf.gov/od/broadeningparticipation/bp.jsp](http://nsf.gov/od/broadeningparticipation/bp.jsp)) As stated on their website, "NSF defines broadening participation in terms of individuals from underrepresented groups as well as institutions and geographic areas that do not participate in NSF research programs at rates comparable to others." Part of the approach the NSF uses to address broadening participation foundation-wide is through a portfolio of programs designed to target individuals from underrepresented groups, institutions and geographic areas. The Division of Astronomical Sciences' Partnerships in Astronomy & Astrophysics Research and Education (PAARE) is just such a program. However, despite a number of successes, NSF program officers say that they

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laborative effort between African scientists and international partners, including members of the AAS CSMA and the National Society of Black Physicists (NSBP), these thoughts have moved one step closer to becoming a reality.

### The History of AfAS

The call for a Pan-African professional society of astronomers goes back several years. In 2008, both Peter Martinez (South African Astronomical Observatory) and Pius Okeke (University of Nigeria Nsukka) published articles on ways to develop astronomy in Africa, the latter specifically calling for the formation of a Pan-African African Astronomical Society. Regional professional astronomical societies had been formed already in West Africa, East Africa, and North Africa, and the history of astronomy in South Africa is also well documented.

While participating in the January 2008 Edward Bouchet-Abdus Salam Institute (EBASI) meeting in Cape Town, several African and American colleagues resolved to form the African Physical Society (AfPS), a Pan-African professional society. EBASI, an institute which has long involved members of the NSBP and the African physics community, formed the AfPS to act as an interlocutor between sister societies around the world, very much in keeping with Nobel Laureate Abdus Salam's vision for the development of physical sciences in Africa.

As plans were developing for the launch of the AfPS, Charles McGruder, an astronomy professor at Western Kentucky University and Past-President

and current chair of the International Committee of NSBP, attended a conference in Addis Ababa, Ethiopia. There he met Ernst Groningen, an astronomer who is the Program Director of the International Science Program (ISP) at Uppsala University in Sweden. Groningen stated that ISP has funds but no astronomers to support, while McGruder responded that he knows many African astronomers who do not have support.

Noting ISP supports groups and not individuals, Ahmadou Wague (a physics professor at the University of Cheikh Anta Diop in Senegal) encouraged McGruder to form an astronomy group. Lawrence Norris, the Managing Director of NSBP, suggested that this group form the African Astronomical Society (AfAS) in much the same way as the AfPS was being formed.

At the January 2010 launch of the AfPS in Dakar, a number of astronomers from throughout the continent and the African diaspora resolved to form the African Astronomical Society (AfAS). Following this meeting, Pius Okeke wrote a whitepaper ([available at the URL: africanastronomicalsociety.org/dakar\\_whitepaper/](http://africanastronomicalsociety.org/dakar_whitepaper/)) on the formation and the structure of the AfAS that was widely disseminated amongst African astronomers.

At the same time, Claude Carignan (Université de Montréal), who was at the Dakar meeting, was actively organizing an IAU Symposium on galaxy formation in Ouagadougou, Burkina Faso, for December 2010. The Dakar meeting participants decided to found the AfAS at this IAU symposium, which was supported by UNESCO and several other

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*The AfAS Working Group (above) produced the Ouagadougou Declaration, marking the founding of the African Astronomical Society.*

## Where is PAARE? (cont'd)

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do not anticipate that the PAARE program will be available in FY2012. Furthermore the program's fate in future years is uncertain.

The PAARE program had its first awardees in 2008. Nine proposals have received funding over the last 4 years, with monetary awards ranging from \$240K to just over \$2M. According to the program solicitation, "The objective of PAARE is to enhance diversity in astronomy and astrophysics

research and education by stimulating the development of formal, long-term, collaborative research and education partnerships among minority-serving institutions and partners at research institutions, including academic institutions, private observatories and NSF Division of Astronomical Sciences (AST) supported facilities." PI eligibility is restricted to individuals with affiliations at minority serving institutions (MSIs). A few of the PAARE grant programs have been highlighted in Spectrum Newsletter articles over the years (see the Appendix at the end of this article).

In interviews, when asked about the strengths of PAARE, several PI awardees brought up the same points. Of foremost importance was the fact that the program is very flexible allowing for a diversity of implementations of a plan designed to meet the broad objectives of PAARE. The program allows for creativity in the proposal details. PIs felt that they were able to structure programs tailored to their specific student population and own research interests, insuring the success of their programs.

Inherent in this ability to tailor the program to specific needs is the advantage that the funding for each program is also flexible. PIs are able to identify how funding will best serve their constituency either through, for example, direct scholarships to attend university, travel support or work study. As a result, PIs have also been able to leverage additional money from their universities or other grants to supplement support for students.

PIs also identified the targeting of MSIs as a strength of the PAARE grant. "If the goal is to enhance diversity in the field, then MSIs have the pool of students needed to begin to do that," commented one PI. However, many of the students at MSIs have not had access to the idea of research astronomy or physics as a career. As one PI put it, "... there are not many role models [for research] here... students who would have gone on to be cooks or gas station attendants are identifying neutron stars." These students are gaining the necessary skill set for astronomical research but they can also apply those skills to many other high level STEM jobs. "[The PAARE program] has changed lives."

Promoting the development of formal long-term collaborations within the program was noted to be beneficial both to the students and the MSI faculty PIs. Students in many of these programs gain the opportunity to not only work on data from

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## News You Can Use

*If you would like to contribute stories to 'News You Can Use', send articles and ideas to the Editor: [lopez@space.mit.edu](mailto:lopez@space.mit.edu)*

### **2011 JOINT ANNUAL CONFERENCE OF THE NATIONAL SOCIETY OF BLACK PHYSICISTS AND THE NATIONAL SOCIETY OF HISPANIC PHYSICISTS TO BE HELD IN SEPTEMBER**

The 2011 joint annual conference of the National Society of Black Physicists and the National Society of Hispanic Physicists will be September 21-24 in Austin, Texas. The conference will be sponsored by both societies as well as the National Science Foundation, the Southeastern Research Association and the University of Texas at Austin.

With over 600 participants, this meeting is the largest gathering of African-American and Hispanic physicists in the world. This is an exceptionally good meeting for students to attend. Students can present posters or oral presentations, attend professional development sessions, scientific sessions; network with fellow students and with faculty. Additionally, the conference includes one of the largest and most successful physics career fairs in the U.S. Financial support for undergraduate and graduate students to attend will be provided to cover travel and lodging on a first-come, first-serve basis.

The organizers will have three astronomy talk sessions at NSBP/NSHP to be held Friday, September 22, as well as a large poster session, and an informal astronomy networking dinner is also planned for that evening. Learn more about the meeting on the web at: <http://conference.nsbp.org>

### **CHANGES TO NSF BROADER IMPACTS AND CSMA RESPONSE**

Over the past year, the National Science Board (NSB) has been conducting a review of the NSF's merit review criteria (Intellectual Merit and Broader Impacts). In May, the NSB Task Force proposed revision to the two merit review criteria to clarify their intent and how they are to be used in the review process. Additionally, the Task Force identified important underlying principles upon which the merit review criteria should be based. The Task Force requested comments and feedback from the scientific community regarding the two revised criteria by July 14, 2011. The revised merit review principles and criteria are printed on the next page.

In response, the CSMA drafted and sent a letter to the NSF with concerns regarding these revised merit review criteria. In particular, the CSMA:

- Urged the NSF to use language that makes very clear that "Broader Impact" activities of proposals must be of the highest quality and are an equally important part of assessing the merit of the proposal.
- Encouraged merit review criteria language that more clearly instructs review panels to give significant weight to the Broader Impact aspects of each proposal in a serious and meaningful way along with the intellectual merit of that proposal.
- Stated that STEM workforce development, particularly related to the participation of underrepresented minorities (URMs), should be viewed as a top priority goal of the broader impacts. Societal demographics demonstrate that URMs will be an increasingly important in the STEM workforce. The expansion and improvement of STEM education at the K-12 levels, undergraduate and teacher development is crucial to the goal of advancing US STEM workforce development. Progress on these fronts is absolutely required in order to increase the global competitiveness of the US technologically and therefore, economically.
- Recommended that the following statement be clarified: "Broader impacts may be achieved through the research itself...". In particular, the language should state that proposers are required to identify how the research itself meets broader im-

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pact criteria and at what stage in the research plan those broader impact goals are expected to be met. In addition, review panelists need very clear guidelines on assessing whether the broader impact criteria has been met by the proposal and can be achieved in the proposed timeframe.

### **Revised Merit Review Principles and Criteria**

The identification and description of the merit review criteria are firmly grounded in the following principles:

1. All NSF projects should be of the highest intellectual merit with the potential to advance the frontiers of knowledge.
2. Collectively, NSF projects should help to advance a broad set of important national goals, including:
  - Increased economic competitiveness of the United States.
  - Development of a globally competitive STEM workforce.
  - Increased participation of women, persons with disabilities, and underrepresented minorities in STEM.
  - Increased partnerships between academia and industry.
  - Improved pre-K–12 STEM education and teacher development.
  - Improved undergraduate STEM education.
  - Increased public scientific literacy and public engagement with science and technology.
  - Increased national security.
  - Enhanced infrastructure for research and education, including facilities, instrumentation, networks and partnerships.
3. Broader impacts may be achieved through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by the project but ancillary to the research. All are valuable approaches for advancing important national goals.
4. Ongoing application of these criteria should be subject to appropriate assessment developed using reasonable metrics over a period of time.

### Intellectual merit of the proposed activity

The goal of this review criterion is to assess the degree to which the proposed activities will advance the frontiers of knowledge. Elements to consider in the review are:

1. What role does the proposed activity play in advancing knowledge and understanding within its own field or across different fields?
2. To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?
  1. How well conceived and organized is the proposed activity?
  2. How well qualified is the individual or team to conduct the proposed research?
  3. Is there sufficient access to resources?

### Broader impacts of the proposed activity

The purpose of this review criterion is to ensure the consideration of how the proposed project advances a national goal(s). Elements to consider in the review are:

1. Which national goal (or goals) is (or are) addressed in this proposal? Has the PI presented a compelling description of how the project or the PI will advance that goal(s)?
2. Is there a well-reasoned plan for the proposed activities, including, if appropriate, department-level or institutional engagement?
3. Is the rationale for choosing the approach well justified? Have any innovations been incorporated?
4. How well qualified is the individual, team, or institution to carry out the proposed broader impacts activities?
5. Are there adequate resources available to the PI or institution to carry out the proposed activities?

# Introduction to the National Astrophysics and Space Sciences Programme

by *Jarita Holbrook, UCLA*

**S**outh Africa has strategically taken the lead in astronomy on the African continent. Their government has consistently invested in big ticket astronomy items such as the Southern Africa Large Telescope (SALT) and now the Karoo Array Telescope (MeerKAT). They are now home to the International Astronomical Union's Office for Astronomy Development, and they have submitted a bid for the Square Millimeter Array (SKA). The South African government has also made a commitment to building the workforce to use and support these efforts in astronomy through an international program to educate the next generation of astrophysicists.

The National Astrophysics and Space Sciences Programme (NASSP) opened its doors in 2003. The program is a collaboration between fourteen South African universities and the four major observatories:

- South African Astronomical Observatory (SAAO: <http://www.saa.ac.za/>)
- Hartebeesthoek Radio Astronomy Observatory (<http://www.hartrao.ac.za/>)
- High Energy Stereoscopic System (HESS, in Namibia: <http://www-hfm.mpi-hd.mpg.de/HESS>)
- Hermanus Magnetic Observatory (HMO: <http://www.hmo.ac.za/>).

Arguably, University of Cape Town (UCT) has long been the top university in Africa for astrophysics. However, with an eye to the future, the department of astronomy and the cosmology group is relatively small and near capacity for producing new PhDs. With the headquarters of the SAAO, UCT, HMO, and several other nearby universities that have astronomers, the Western Cape Province probably is home to the most astronomers, but there are also astronomers scattered throughout the rest of South Africa. NASSP brings together the resources offered by the larger South African astronomical community for the common goal of increasing the number of astronomers. NASSP is based at UCT and SAAO in Cape Town. NASSP is fully supported by the South African government. Students receive a stipend that includes a housing allowance.

NASSP has two main parts: an honours program and a masters program. In South Africa, undergraduate education lasts only three years with the option of doing a fourth year honours. Rather than remain at their undergraduate institution, NASSP students come to Cape Town for their honours year.

The honours year consists of classes in mathematics, physics, computer programming, and astronomy, along with a research project designed to be completed in six months. The research project allows the students to work one-on-one with a professor, and oftentimes it is their first experience doing research. Students must receive passing grades in order to continue to the Masters of Science program. Each year around two students do not pass onto the Master's program, another one or two decide to go into a Master's program not in astronomy and space science, and maybe one decides to get a job in industry.

The Masters of Science program is structured to be six months of classes and a year and a half of research leading to a Masters thesis. Once in the Masters program, most students remain until completion, however, they often take more than two years. As long as the students maintain good academic standing NASSP will pay them for the three years of the honours and Masters, they have to petition to receive another year of funding if their Masters takes longer to complete.

Receiving the Masters marks the end of the program. The students must be accepted into a doctorate program on their own and in most cases their doctorate institution will cover their expenses. Of the Masters students, ten students have gone on to complete their doctorates thus far, many more are currently enrolled in PhD programs. The demographics of the ten PhDs are: four are white South African women, one is a white South African male, one is a Black South African female, the remainder are Europeans and African men who are not from South Africa.

The initial years of the program suffered from an inability to educate Black South Africans. White South Africans and Africans from other African countries were far more successful. In order to remedy the situation, NASSP created the Extended

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*NASSP 2010 group photo of honours, extended honours, and Masters students.*

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Honours program in 2008. The Extended Honours program is fully funded by the South African government, and it entails a pre-NASSP year at the University of Cape Town. During that year the students take classes and complete a research project similar to the NASSP Honours. However, only Black South Africans are in the Extended Honours program. If they maintain passing grades, they automatically enter the NASSP Honours program. The Extended Honours program has dramatically increased the success and retention of Black South African students in NASSP, though they still lose about two students a year.

My current book project focuses on specific behaviors of professors, institutionalized racism,

and the expectation of the Black South African students that led to their failure to survive NASSP, as well as what remains to be done to improve the environment and physical conditions within NASSP for all of their Black South African and African students.

*Dr. Jarita Holbrook is a Visiting Scholar in the Women Studies Department at University of California, Los Angeles. Dr. Holbrook is the Chair of the AAS Historical Astronomy Division.*

## Reducing the Impact of Negative Stereotypes on the Careers of Minority and Women Scientists

*By Daisy Grewal, Stanford University Medical School*

**S**ocial science research powerfully demonstrates how stereotypes, even those that people are not consciously aware of, can influence the careers of women and minorities. For example, people rate the quality of a scientific paper differently depending on whether they think a man or a woman wrote it [1]. Stereotypes also reduce the self-esteem, motivation, and intellectual performance of women and minorities through a process called stereotype threat. Stereotype threat reduces performance in situations where an individual might confirm a negative stereotype about his or her group. In one example, researchers found that African-American college students performed worse on an SAT test [2] when the students had been told that the test is a valid measure of intelligence.

Such findings suggest that negative stereotypes pose a serious career obstacle for women and minority scientists. In 2006, the National Academy of Sciences released the report "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering" [3], which recommended that scientific institutions adopt interventions that combat stereotypes. See the box on p. 9 for recommendations on what institutions can do.

But the focus of this article is on individual scientists: What can they do to prevent stereotypes from stifling their career advancement? The advice this article offers is derived from my experiences as a social psychologist working in the Office of Diversity and Leadership at Stanford University School of Medicine. Individual scientists can take at least three steps to buffer themselves against negative stereotypes: educating themselves and others about the science of stereotypes, adopting a growth mindset, and expanding their professional networks.

### **Educate Yourself and Others About the Science of Stereotypes**

One simple-yet-effective way to combat stereotypes is to raise awareness of how stereotypes affect decision-making. Making people more aware

of these processes helps them -- and you -- self-correct and thereby reduce the negative effects of stereotypes on decisions. Educating others can be as simple as presenting them with the social science research that demonstrates how, why, and when stereotypes are most likely to influence evaluation decisions.

When talking to others about stereotypes, it is important to emphasize that stereotypes are often not under our conscious control. Emphasizing this fact will reduce feelings of defensiveness. Scientists have been able to measure our unconscious stereotypes through a computer task called the Implicit Association Test (IAT). You may want to take the IAT at the Web site Project Implicit (<https://implicit.harvard.edu/implicit/>) and encourage others to do the same. Most people find their results on the IAT surprising. Because stereotypes originate from the societies we live in, we all hold them to some degree.

Evidence is growing that educating people about stereotypes helps foster diversity in science. At least two studies -- one at the University of Michigan, Ann Arbor [4], and the other at the University of Wisconsin, Madison [5] -- have shown that educating science faculty members about stereotypes leads to improvement in the rates at which women are hired onto faculties. Faculty attendance at training events also correlated with better hiring experiences for faculty recruits, especially women.

So, while it's a good idea to try to raise awareness, stereotypes are a touchy subject. An alternative to forcing people into a difficult conversation is to direct them toward resources from credible national organizations. For example, the Association of American Medical Colleges offers a free e-learning seminar titled "What You Don't Know: The Science of Unconscious Bias and What To Do About it in the Search and Recruitment Process." [6]

Learning more about the science of stereotypes can also help women and minorities prevent stereotypes from interfering with their intellectual performance. In one study, researchers taught women college students about stereotype threat and how it

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### ***Recommendations for Institutions on Reducing the Impact of Negative Stereotypes***

1. Demonstrate institutional commitment to diversity through strategic plans, mission statements, and other communication to employees.
2. Educate organizational leaders on how stereotypes, especially those that are unconscious, affect hiring and evaluation decisions.
3. Consider educating all employees about how stereotypes affect decisions.
4. Diversify the members of all hiring committees.
5. Make efforts to diversify candidate hiring pools in order to avoid creating "tokens."
6. Create ground rules for hiring discussions, including keeping job criteria front and center and focusing on evidence rather than opinions.
7. Appoint at least one senior leader who is responsible for monitoring institutional fairness.
8. Although numbers are important, focus equally on creating an inclusive organizational culture that supports diversity.
9. Help build and support professional networks that connect scientists of different backgrounds and ages.
10. Develop leadership-development programs for scientists that incorporate diversity training.

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affects performance. Those women did just as well as men on a subsequent math test [7]. These results suggest that simply informing stereotyped groups about how stereotype threat works can diffuse its power.

### **Grow Your Mindset**

Stanford University psychology professor Carol Dweck has found that our views of human nature influence our likelihood of stereotyping others [8]. People with a "fixed" mindset view human abilities as stable and difficult to change; consequently, they are more likely to use stereotypes to describe themselves and others. In contrast, people who have a "growth" mindset view human abilities as malleable through sustained effort. They are less likely to stereotype themselves or others.

Research has shown that a fixed or growth mindset can have powerful effects on people's behavior, especially people who belong to stereotyped groups. For example, African-American students with a fixed mindset are less likely to incorporate constructive criticism when trying to improve their intellectual work [9]. Among women taking an advanced math class, those with fixed mindsets felt more anxious during the class and

didn't perform as well [10]. In contrast, the women with growth mindsets felt more comfortable and confident in their abilities and performed better. Importantly, the women with the growth mindsets were just as aware of negative stereotypes about women in math, but their mindsets gave them a resilience that helped them overcome those stereotypes.

People with growth mindsets are less likely to become discouraged after making mistakes and more likely to view difficult situations as challenges rather than threats. Adopting a growth mindset can benefit everyone, but it might be especially important for those who belong to stereotyped groups.

You might think there is little you can do to change your mindset, especially if your mindset is fixed. Dweck, however, has been able to change people's mindsets in experimental settings. She suggests four steps:

- Pay attention to what you are telling yourself.
- Recognize that you have a choice.
- Talk back to your fixed mindset "voice."
- Accept challenges and interpret the results within a growth mindset.

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## Strategies for Addressing Harassment and Prejudice: Summary of the January 2011 AAS Special Session

*By Dara Norman, National Optical Astronomy Observatory*

**A**s part of the January 2011 AAS meeting in Seattle, WA, the CSMA and CSWA jointly sponsored a special session entitled, "Strategies for Addressing Harassment and Prejudice". The session provided practical information on addressing harassment and prejudice in the workplace and the classroom. The session featured two speakers selected because of their expertise with the legal, human resources and EEOC aspects of combating harassment and prejudice in the workplace, as well as for their familiarity with the field of Astronomy. Sheryl Bruff is Human Resources Branch Chief at STScI and is also the STScI AURA Diversity Advocate. Prof. Bernice Durand has been the Vice Provost for diversity and climate, senior diversity officer and is a professor of physics at University of Wisconsin, Madison. She is also the Chair of the AURA Workforce and Diversity Committee. The two speakers spoke jointly in a 'tag team' style providing information on documenting abuses, seeking help and support within as well as outside of one's immediate workplace, and the legal obligations of those to whom the abuse is reported. Their presentation, entitled, "Building Respect and Inclusion in Astronomy: Strategies for Addressing and Overcoming Harassment" is available on the CSMA website ([csma.aas.org](http://csma.aas.org)) in the section labeled, "Past meetings and Activities" or on the CSWA website at [www.aas.org/cswa/MEETINGS.html](http://www.aas.org/cswa/MEETINGS.html).

In the beginning, the session was very sparsely attended with a conspicuous lack of men in the audience. However, about half way through the session the numbers of attendees had increased, as had the (still few) numbers of men. These numbers may in part be due to the fact that the session was scheduled in a remote region of the Seattle Convention Center that was difficult to find and well separated from the science talks taking place on the floor above. However, there was at least one AAS council member and one vice president in attendance.

The presentation was quite comprehensive, with information covering the legal definition of harassment, what should be expected from one's

institution if harassment is reported, to examples of institutional infrastructure for dealing with harassment from the speakers' own institutions. There was discussion throughout the presentation. At one point the question was posed to the audience, "How many of you know what the policy is at your institution or university on harassment or where you can go if you have been harassed?" As might have been expected, several hands went up from people employed as faculty or staff at universities or other facilities. However, there were nearly no hands from students (undergraduate or graduate) and few hands from post-docs. This failure to give information to students, particularly graduate students who are most often the victims of harassment is exactly the issue that this special session was intended to address.

Informal discussions with a few attendees revealed that the session received some mixed reviews. While many people found the information provided somewhat useful there still seemed to be the prevailing sense that there was little that victims of harassment or bias could do without endangering their own career. Still, the prevailing sense seemed to be that people felt that despite departments would still side with faculty, leaving victims vulnerable. This sentiment demonstrates just how engrained and pervasive acceptance of harassing and biased behavior is in our field. The CSMA and CSWA intend to press this issue by continuing to provide information and resources to students. Please look for future special sessions on the theme of eliminating harassment and bias from our field.

There is also an article on this special session that appears in the June 2011 issue of the CSWA's STATUS Newsletter, which like Spectrum, is now exclusively available online.

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## Reducing the Impact of Negative Stereotypes... (cont'd)

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For a more in-depth look at these four steps, visit Dweck's website:  
<http://mindsetonline.com/changeyourmindset/firststeps/index.html>.

### Expand Your Professional Networks

An unfortunate byproduct of stereotypes is that they often make people feel like they don't belong, which can exert powerful effects on people's career choices. For example, research shows that women who feel like they don't belong in computer science are less likely to want to pursue a career in it, even if their aptitude for computer science is high [11].

Women and minority scientists are at a higher risk of feeling like they don't belong or fit in with their colleagues. Feelings of belonging directly influence people's motivation and satisfaction with a scientific career and can predict whether they stay at an institution.

If your institution provides opportunities for networking with colleagues, you should attend. Networks serve many purposes, including mentoring, access to information, and professional and personal support. If you don't have an official networking program, develop your own, unofficial one. Make an effort to keep in contact with colleagues who support you and your career. Talking with experienced scientists, who have weathered challenges in the past, can help women and minorities interpret difficulties less personally, improving their resiliency. In experimental settings, researchers have found that increasing feelings of belonging provides a buffer against negative stereotypes and reduces the drop in performance caused by stereotype threat [12].

The world would be far better place if women and minorities did not have to deal with negative stereotypes in the first place. History and society have placed the burden of negative stereotypes unfairly on women and members of minority groups. By providing early-career researchers with strategies that can help them deal with stereotypes, we are by no means absolving institutions of their responsibility to confront and try to change negative stereotypes. Universities and other scientific organizations have an obligation to do this, and their contributions -- like the contributions of individual scientists -- are necessary if we are to avoid losing out on critical sources of scientific talent.

*Daisy Grewal is a research scientist in the Office of Diversity and Leadership at the Stanford University Medical School. She studies the effectiveness of different types of interventions on improving the recruitment and retention of women and minority scientists. This article was originally published in Science Careers and was reprinted with permission from AAAS and the author.*

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## The African Astronomical Society Arrives... (cont'd)

*(Continued from page 2)*

ers. In a visit to Cape Town, Carignan and Kevin Govender, then the manager of the Collateral Benefits Division of SAAO, agreed to organize a Skype teleconference to gain support for the AfAS.

To carry out the work of forming the AfAS, an Interim Working Group (IWG) was formed, which convened for the first time at a workshop concurrent with the Ouagadougou IAU Symposium. This Interim Working Group consisted of 15 members representing six regions. From West Africa were Pius Okeke (Nigeria), Jacob Ashong (Ghana), and Claude Carignan (Burkina Faso). From East Africa were Paul Baki (Kenya), Legesse Kebede (Ethiopia), and Edward Jurua (Uganda). From Central Africa were Donatien Njomo (Cameroon) and Patrice Okouma (Gabon). From Southern Africa were Nalini Issur (Mauritius), Patricia Whitelock (South Africa) and Kim de Boer (South Africa). Representing Northern Africa were Jamal Mimouni (Algeria) and Hassane Darhmaoui (Morocco). And, representing the African international community were Charles McGruder and Hakeem Oluseyi of the USA. Ed Guinan, a member of the AAS Council, was also in Ouagadougou. Figure 1 shows an image of many of the IWG members and others who participated in the Ouagadougou workshop.

The primary products of the Ouagadougou conference were:

- The Ouagadougou Declaration, which officially launched the organization and was composed by the IWG collaboratively as a collective;
- The new constitution of the AfAS which was composed primarily by three IWG members and approved by the IWG;
- A plan for the incorporation and legal launch of the organization set for April 2011.

To lead the organization from January 2011 to its official launch, Hakeem Oluseyi was elected the Interim President. The selection of officers was conducted through a nomination process led by Patrice Okouma, who was the Chair of the Interim Nominating Committee of the AfAS. The AfAS was ceremoniously launched at the 2nd Mideast Africa Regional IAU Meeting in Cape Town, South Africa in April 2011.

Sweden's International Science Programme and NSBP played indispensable roles in the start-up of AfAS. Sweden provided direct financial support for the organization's start-up. NSBP also pro-

vided financial and continues to provide much strategic, management and logistical support.

### What Will the AfAS Do?

The vision of the AfAS is to be "...the voice of the astronomy profession in Africa in order to promote and support research on the continent, and to facilitate the use of astronomy in addressing the challenges faced by Africa." As a professional society the AfAS seeks to be the primary organizing body for networking, professional development, communicating, planning, and archiving the work of professional astronomers on the African continent.

There are many ways to approach this objective. In the first instance, AfAS has to be a voice for more financial support for science and for astronomy in particular. Several years back, the 53 African governments pledged to fund science at the level of 1% of GDP. To date none have met that target. We know what investment in science means for economic development, and we understand the pressures under which fiscal decisions are made. AfAS as an organization, and AfAS members as individuals, must rise up and be advocates for sound science policies if we are to see the unique promise of African astronomy come to fruition.

Second, we must ensure that investments in astronomy lift the socioeconomic status of the African people. In real terms astronomy does lead to economic development. Observatories stimulate local economies. They help build knowledge-based economies. There are many commonly used technologies and consumer products that came about through astronomy research.

Generally people of all ages have a desire to connect with the sky. Astronomy ignites a passion for science like no other scientific field. Learning about astronomy unbridles the imagination and inspires youth to pursue math and science at school, and to follow careers in science and engineering. This creates a critical mass of problem solving thinkers, able to find solutions to the water, food, health, energy and environmental challenges of the continent.

Possible aims/pursuits of the AfAS are to:

- Run a peer review process and resource planning consultation for the purposes of funding research supported by the African Union and and other

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national and international organizations. When such projects are finally approved for execution, AfAS should be a primary voice on how those funds are spent on astronomy.

- Commission a decadal survey of astronomy and astrophysics in Africa with a 'plan of action' for astronomy in Africa, put forward by African professional astronomers.
- Empanel a group to study what should be included in the research portfolios of the space agencies of Algeria, Egypt, Morocco, Nigeria, South Africa, and Tunisia. Most of these agencies have their eye on space-based Earth observation. Why should an African space telescope not be part of the constellation of missions in space-based astronomy?
- Archive the scholarly work of African astronomers.
- Collaborate with our sister society, the African Physical Society (AfPS), in conducting a survey of African physics departments on the size, course offerings and research opportunities in astronomy. Since there are few to none freestanding astronomy departments at African universities, this is an especially a good project for AfAS and AfPS to collaborate.
- Organize continent-wide research training courses. With the MeerKAT/SKA project, the Nigerian Radio Telescope, the Mauritian Radio Telescope, and the African VLBI network, Africa is already active in radio astronomy. Courses in pulsar timing, computing and data reduction, control room operations and other specialty topics can easily be organized to build the cadre of African who are participants at the front line of the global radioastronomy enterprise. Likewise, the SALT is the premier optical astronomy facility in the world. AfAS will take a lead role that there are Africans at the forefront of the SALT user community and leadership at the telescope.
- Sponsor training in high-energy astrophysics. The HESS Observatory in Namibia already takes advantage of Africa's natural geographic advantage, and Africa is vying for the next generation gamma-ray telescope, the Cherenkov Telescope Array (CTA). But it has not taken advantage of a lot of African human talent.

- Work with AfPS to build more and better tertiary level astronomy programs, especially in countries that have no such programs presently.
- Expand the access to astronomy for all. The society will set as a goal to establish at least one planetarium in each country to be used in supporting public awareness programs. We shall articulate standards for exposure to, knowledge of, and achievement in astronomy for all learners across the continent. Astronomy is an African science, and all Africans should know about it.

These are just a few vistas on the early journey of the AfAS. We invite all interested parties to join us in advancing astronomy in Africa.

*Charles McGruder is a Professor of Astronomy at Western Kentucky University. Professor McGruder is a Past-President and current chair of the International Committee of the National Society of Black Physicists.*

*Hakeem Oluseyi is an Assistant Professor in the Physics and Space Sciences Department at the Florida Institute of Technology. Professor Oluseyi is the Immediate Past President of AfAS, and he is also an appointed member of the AAS CSMA.*

*Lawrence Norris is the Managing Director of the National Society of Black Physicists.*

*Pius Okeke is a Professor in the Physics and Astronomy Department at the University of Nigeria Nsukka, and Professor Okeke is the President of AfAS.*

## Where is PAARE? (cont'd)

(Continued from page 3)

the top national facilities (e.g. Arecibo, KPNO, CTIO, Greenbank), but also to travel to these facilities in order to take the data themselves. Often students have the opportunity to work with researchers outside their own institutions further allowing them to experience and understand the research culture and gain access to additional mentors. PI awardees noted that these partnerships had reinvigorated their own research programs through collaboration with active researchers and their students, as well as through access to collaborative private facilities (e.g., the Steward Observatory, McDonald Observatory). Extremely important in this regard is the ability of awardees to obtain release time from heavy teaching loads at these MSIs in order to conduct these research programs with students.

As might be expected, many of the MSI PIs did already have some relationship with their partner institution(s). However, the PAARE experience often allowed them to grow and strengthen the partnership. In some cases this has meant (or is anticipated to mean for the more recently funded programs) a direct feed of students from the PAARE sponsored program to the partner institution as graduate students. Given the dismally low numbers of minority students who have continued on to graduate school and beyond in the past (see e.g., the June 2009 issue of *Spectrum* article, entitled "Minority and Female PhD Attainment in Astronomy") these few students represent a large increase of minority student representation in the field. The success of the MSI students in many of these programs has also been recognized by partnering institutions who have asked some PAARE PIs to provide their expertise on other proposals.

So with these many strengths, why is the PAARE program being put on indefinite hold starting in 2012? "We are not sure how effective the program has been since its inception", says program officer Scott Fisher. "...Is this type of program the most effective way to support broadening participation activities by NSF/AST?" He notes too that the budget for the program has already been cut from earlier levels. During this program break, AST plans to begin a comprehensive assessment of the program. "These kinds of assessments are going on foundation-wide," Dr. Fisher points out, "[the continuation of PAARE] is one of many difficult decisions that will need to be made. We need to understand if a program with a budget

on the order of \$1M/yr is having enough impact." However, it is not yet settled how the assessment of PAARE will be done or what metrics will be used. Fisher and colleagues are working on that now. Some of the items that will be evaluated are the numbers of programs funded, how the existence of the program is communicated to qualified proposers, and whether the program should be expanded to include other disciplines or NSF divisions.

Currently, successful PIs are funded at their requested levels. With a program budget cap of \$1M/year, this means that very few programs can be funded. An important assessment to make will be to determine whether it is more effective to cap PIs on their monetary request and instead fund more proposals at lower levels. The PAARE program receives about 5-10 proposals per year. While this number may seem small, the relatively small program budget means that even some very good proposals do not get funding. "We have funded some great proposals," Fisher points out, "[I am] not concerned about the quality of the proposals that receive funding." However the low numbers suggest that perhaps the word is not getting out to all the people who might want to propose to PAARE. "I would be happy with a doubling of the number of proposals [received annually]," Fisher acknowledges.

The PAARE program is somewhat unusual within NSF because it is a program for broadening participation that is run from a Division (AST) rather than from a larger Directorate (Mathematics and Physical Sciences or MPS). This may also have the consequence of making the program harder to sustain in difficult budget cycles. In fact, part of the reason for the 2012 hiatus is that one funding source for the program disappeared. In the anticipated assessment plan, AST will certainly look at whether the program should be scoped more broadly in order to be more effective.

While Fisher stresses that conducting an assessment is the main reason for the postponement of new funding cycles for PAARE, the NSF has noted that Astro2010 (the Decadal Review) did not make any specific recommendations regarding broadening participation programs at NSF or elsewhere. With the current difficult budget situation, AST intends to look closely to recommendations made in Astro2010 for funding priorities. With no specific recognition of broadening participation programs like PAARE, the conclusion is that they

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are not a priority of the astronomy community, whereas recommendations that NSF place high priority on increasing general research grants and instrumentation grants are clearly part of Astro2010.

This failure of Astro2010 was pointed out in an earlier Spectrum article (see the p.1 article of the January 2011 *Spectrum*, entitled “The 2010 Decadal Survey Report Comes Up Short on Diversity”). In the article, the authors observe that the section on underrepresented minorities in the Astronomical workforce does contain a detailed list of “approaches that might be adopted” by the community but none of these are in the form of recommendations. Furthermore, none of these approaches are addressed to any particular segment of the community to pursue. This omission in Astro2010 has apparently resulted in direct consequences for AST’s PAARE program.

The NSF/AST seems to be genuinely interested in broadening participation in astronomical study and research. However unless the community steps up and let’s them know that there is a significant segment of the astronomy and astrophysics community who think these types of programs are important, the demise of programs like PAARE are increasingly likely in the current budget climate. A more direct, coordinated and large-scale effort is needed to demonstrate that these types of programs are worthwhile.

Dr. Fisher says that he is more than happy to discuss potential alternative funding source with individuals or groups that want to propose for PAARE or a PAARE-like programs beyond 2011.

#### **Appendix of PAARE programs from 2008-2010**

- Partnerships in Observational and Computational Astronomy (POCA) is a partnership between professors at South Carolina State University, an historically Black university (HBCU), and researchers at NOAO and Clemson University. Students participate in research using archival data to study RV Tauri stars and gamma-ray bursts. Dr. Don Walter is the PI (see p.1 of the January 2009 issue of *Spectrum*, entitled “A Partnership in Observational and Computational Astronomy”).
- Graduate Opportunities at Fisk in Astronomy and Astrophysics Research (GO-FAAR) is a program in which students from Fisk University (an HBCU) are involved in research at partner universities and facilities: Vanderbilt, Boston University, NOAO, NSO, SURA, University of Hawaii, Hilo and University of Cape

Town. The research areas include instrumentation. Dr. Keivan Stassun is the PI.

- Pulsar Search Partnerships recruits talented students from the local area and gives these students full 4 year scholarships to study physics at University of Texas, Brownsville. Their research includes identifying pulsars in data from Arecibo and Greenbank radio telescopes. The PI is Dr. Fredric Jenet.
- California-Arizona Minority Partnership for Astronomy Research and Education (CAM-PARE) is a partnership between California State Polytechnic University (CPP) and the University of Arizona’s Steward Observatory. This program gives students an REU-like experience at UAZ in both astronomy and science education research. CPP faculty and students also gain access to the telescope at Steward Observatory for their research. Dr. Alex Rudolph is the PI. (See January 2011 issue of *Spark*)
- A Partnership for Minority Education and Research on Black Hole and Neutron Star Binaries enables students from the University of Texas, El Paso to participate in research at the McDonald Observatory and with scientists at UT, Austin. For this recently funded program the hope is that a few students will be able to bridge to graduate school at UT, Austin or other universities. Students also participate in outreach to local high schools students. The PI is Dr. Paul Mason.
- Correlative Radio Observations of Cosmic Gamma-Ray Sources is a partnership between Southern University, an HBCU in Louisiana, and researchers at Univ. of Massachusetts, Amherst. Dr. John Stacy is the PI.
- A PAARE Program Between New Mexico State University, the National Solar Observatory and Air Force Research Lab allows students to participate in research modeling space weather. The PI is Dr. Bernard McNamara.

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